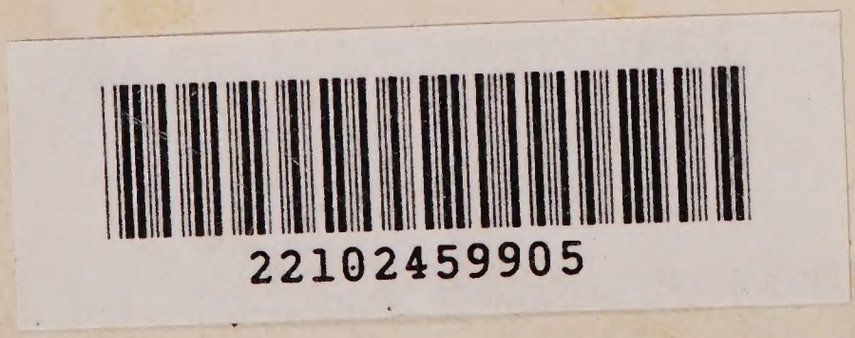
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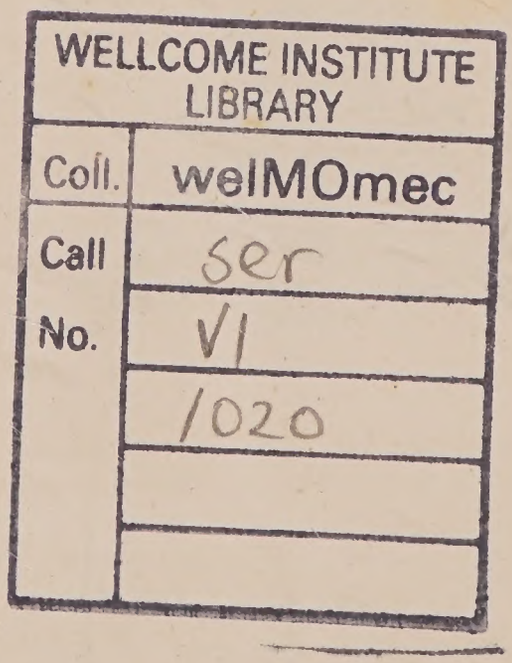

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INDEX.

Abortion among Cows, 222.
Academie des Sciences of France, 228
Acetic Acid as an Antiseptic, 468.
Adami, J. G. Notes on Epizoöty of Rabies, 424.
Aneurism of the Aorta, 160.
Animal Tuberculosis, 311.
Animal Vaccination, 239.
Anthrax, 67.
Anthrax in Deer, 225.
Anthrax, Recent Outbreak, 298.
Anthrax, Report of Outbreak, 76, 162.
"Anthrax," Report of Outbreak in India, 246.
Antirabic Inoculations, 149.
Arloing, Prof. Tuberculosis from a Sanitary and Alimentary Point of View, 293,
Army Horses in the United States, 471.
Army Veterinary Department, 69, 147, 225, 306, 388, 465.
Arsenical Poisoning, 223.
Asthma, 2.
"Azoturia;" Its Etiology, 244.

Bacteria? Does Salting Meat Destroy, 389.
Bacteriological Study of Lesions of Pleuro-pneumonia, 421.
Baltimore University, U.S.A., School of Veterinary Science, 451.
Baltimore Veterinary College, 283.
Berne, J. C. Asthma, 2.
Blind Horses, 472.
Border Counties Veterinary Medical Society, 214.
Brett, J. A Mole in the Mare, 159.
Brett, J. Injury and Rupture of Œsophagus in a Cow, 242.
Burke, R. W. Mane-and-tail Disease of the Horse, 409.
Cancer in the Lower Animals, 330.
Bursatti by Sloughing, Treatment of, 325.
Butler, J. S. Successful Operation for the Cure of Laryngismus Paralyticus, or Roaring, in Horses, 404.

Cancer and Age in Animals, 227.
Cancer in the Lower Animals, 330.
Central Veterinary Medical Society, 54, 377.
China, The Horse in, 113.
Clever Criticisms, 149.
Colic in the Horse, 83.
Comminuted Fracture of the Scaphoid and Cuneiform Bones, 245.

CORRESPONDENCE:—

Animal Tuberculosis, 311.
Blind Horses, 472.
Clever Criticisms, 149.
Expert Witnesses, 232.
Fair Reporting, 71.
Flies as Bearers of Contagia, 151.
History of Tuberculosis, 312.
Menstruation in Animals, 230.
National Veterinary Association, 72.
Overstocked? Is the Profession Becoming, 391.
Practitioners, Foreign and Colonial, 231.
Professional Advertising in Ireland, 232.
Protective Inoculation, 151.
Protective Inoculation for Contagious Pleuro-pneumonia, 310.
Pustular Stomatitis, 229.
Skin Disease in Queensland, 229.

Vaginal Cysts, 390.
Very Desirable, 71.
Veterinary Crematories, 391.
Veterinary Candidates, 390
Veterinary Surgeon, How to Become a, 392.
Cowpox in Italy, 389.
Cunningham, C. Torsion of the Uterus, 318.
Curry-comb, Humane and Economical, 434.

Dangerous Hydropathic Treatment, 227.
Degive, A. Prophylaxy of Bovine Contagious Pleuro-pneumonia, 233.
Desirable, Very, 71.
Diphtheria from Domestic Animals, 226.
Disease Affecting Sheep in Gloucestershire, 223.
Disinfectant, The Best, 388.
Distemper in Dogs, 388.
Docking Horses in the United States of America, 70.
Dogs as Despatch Carriers, 468.
Dogs in London, 309.
Domestic Animals, The Origin of, 148.
Dresden Veterinary School, 227.
Duck, F. An Unusual Case of Lameness, 75.

Edgar, W. A. Contagious Skin Diseases of the Horse, 98, 187.
EDITORIAL:—
Extinction of Rabies, 416.
Half Measures in Sanitary Police, 82.
International Veterinary Congress, 260.
Meat Inspection, 175.
Rabies Revived, 6.
Veterinary Profession and Tuberculosis, 333.
Empirics as Meat Inspectors, 202.
Epizoöty of Herpes Epilans, 176.
Epizoöty of Rabies, Notes on, 424.
Examinations of the Royal College of Veterinary Surgeons, 50.
Expert Witnesses, 232.

Fair Reporting, 71.
Fellowship Examination of the Royal College of Veterinary Surgeons, 464.
Fleming, G. Forage for Military Purposes, 267, 417.
Fleming, G. Physical Condition of Military Horses, 42, 115.
Fibromata Mulluscoid in a Heifer, Case of, 1.
Fitzwygram Prize Competition, 202.
Flies as Bearers of Contagia, 151.
Foot-and-mouth Disease in Germany, 468, 469.
Forage for Military Purposes, 267, 417.
Foundring in the Body, 371.
Foreign and Colonial Practitioners, 231.
Friedberger, Prof. Colic in the Horse, 83.

Glanders, Death of a Medical Professor from, 433.
Glasgow Veterinary College, 68, 357.
Goats, Fatal Disease among in Khandeish, 153.

Hæmorrhagica Purpura, 73.
Horse-flesh Consumption in Paris, 148.
Horse-flesh Law, The Sale of, 389.
Horses and Music, 226.
Horse, Remarkable Jump of a, 468.
Horse Sickness, South African, 74.
Horse Syphilis, 11.
Hutcheon, D. Contagious Pleuro-pneumonia in Goats, 399.
Hydrophobia in Bavaria, 71.
Hydrophobia in Paris, 70.
Hydrophobia, Protective Inoculation against, 469.

Inflammation as a Reparative Process, 210.
Inoculations, Antirabic, 149.
Inoculation, Protective, for Contagious Pleuro-pneumonia, 310, 243.
Of Meat, 287.
Preventive, 29.

International Veterinary Congress, 260.
Lafosse, Professor, 228.
Lambs Reared by Goats, 471.
Lamb, The First Days of, 308.
Lameness, An Unusual Case of, 75.
Laminitis, 370
Lancashire Veterinary Medical Association, 370.
Laryngismus Paralyticus, or Roaring, in Horses, Cure of, 404.
Laryngitis, Chronic, 3.
Treatment of, 336.
Lincolnshire Veterinary Medical Association, 283.
London Dogs' Home, 389.
Longevity in the Horse, Unusual, 148.
Lymphangitis, Case of, 442.

Macgillivray, A. E. Diseases of the Urinary and Generative Organs, 190, 261.
Abnormalities of the Rectum, 313.
Mad Dogs in London, 148.
Mahon, F. C. Fracture of the Tibia in a Greyhound, 413.
Mammitis in the Cow, Infectious, 265.
Mane-and-tail Disease of the Horse, 409.
Mange in Queensland, Report on, 178, 276, 429.
Mare, A Mole in the, 159.
A Remarkable Old, 71.
Marriott, T. Comminuted Fracture of the Lunar and Simple Fracture of the Scaphoid and Cuneiform Bones, 245.
Massacre of Cats, A, 226.
McKenny. Contagious Pleuro-pneumonia Cysts, 406.
Meat Inspection, 175.
Menstruation in Animals, 230.
Meredith, J. A. Report of Outbreak of Anthrax, 76, 162, 246.
Midland Counties Veterinary Medical Association, 54, 296, 435.
Military Horses, Physical Condition of, 42, 115.
Mulluscoid Fibromata in Heifer, 1.

National Veterinary Association, 72.
New Veterinary College, Edinburgh, 69.
Notes and News:—
Academie des Sciences of France, 228.
Acetic Acid as an Antiseptic, 468.
Anthrax in Deer, 225.
Antirabic Inoculations, 149.
Army Horses in the United States, 471.
Bacteria? Does Salting Meat Destroy, 389.
Best Disinfectant, The, 388.
Cancer and Age in Animals, 227.
Contagious Pleuro-pneumonia, 469.
Cow-pox in Italy, 389.
Dangerous Hydropathic Treatment, 227.
Destruction by Wild Animals, 148.
Diphtheria from Domestic Animals, 226.
Distemper in Dogs, 388.
Docking Horses in the United States of America, 70.
Dogs as Despatch Carriers, 468.
in London, 309.
Dresden Veterinary School, The, 227.
First Days of a Lamb, 308.
Foot-and-mouth Disease in Germany, 468, 469.
Horseflesh Consumption in Paris, 148.
Horses and Music, 226.
Hydrophobia in Bavaria, 71.
In Paris, 70.
Lafosse, Professor, 228.
Lambs Reared by Goats, 471.
London Dogs' Home, 389.
Mad Dogs in London, 148.
Massacre of Cats, 226.
Oats, Good, 470.
Old Mare, A Remarkable, 71.
Origin of Domestic Animals, 148.
Perroncito, Professor, 228.
Protective Inoculation against Hydrophobia, 469.
Protracted Incubation of Rabies, 71.
Prussic Acid in Various Plants, 228.
Rabies and Muzzling, 309.
In Turkey, 228.
In the United Kingdom, 71.
Sale of Horseflesh Law, 389.
Shameful Torture of Pigs, 71.

Small-pox Microbe, 469.
Snake in the Body of a Calf, A, 228.
Speed of American Trotting Horses, 225.
Stuttgart Veterinary School, 225.
Sustenance Requirements, 227.
Swine Plague, 469.
In America, 469.
Texas Fever, 468.
Transport Damages, 227.
Tuberculosis, 470.
Typhoid Fever in Dogs, 226.
Unusual Longevity in the Horse, 148.
Vaccination against the Siberian Pest, 308.
Veterinary Research in Italy, 228.
Wood-meal as Forage, 469.
Nunn, J. A. External Seedy Toe, 159.
Horse Sickness in South Africa, 74.
Protective Inoculation, 242.

Oats, Good, 470.
Obituary, 70, 147, 225, 307, 388, 466.
Œsophagus in a Cow, Injury and Rupture of, 242.
Œstermann, T. Treatment of Laryngitis, 336.

Pathology, General and Veterinary Medicine, 464.
Perroncito, Professor, 228.
Peters, A. Mulluscoid Fibromata in a Heifer, 1.
Pigs, Shameful Torture of, 71.
Pleuro-pneumonia, 67.
Anthrax, and Swine Fever, Report on, 462.
Contagious, 469.
Contagious, Prophylaxy of Bovine, 233, 327.
Cysts, Contagious, 406.
In Goats Contagious, 399.
Inoculation, Contagious, 390.
In Queensland, 88.
PROCEEDINGS OF SOCIETIES:—
Baltimore University, U.S.A., School of Veterinary Science, 451.
Border Counties Veterinary Medical Society, 214.
Central Veterinary Medical Society 54, 141, 377.
Examinations of the Royal College of Veterinary Surgeons, 50.
Fellowship Examination of the Royal College of Veterinary Surgeons, 464.
Glasgow Veterinary College, 68, 357.
International Veterinary Congress, held at Paris, 455.
Lancashire Veterinary Medical Association, 370.
Lincolnshire Veterinary Medical Association, 283.
London Pathological Society, 66.
Midland Counties Veterinary Medical Association, 54, 296, 435.
New Veterinary College, 363.
New Veterinary College, Edinburgh, 69.
Royal Agricultural Society, 67, 221, 459.
Royal College of Veterinary Surgeons, 46, 134, 339. 434.
Royal Counties Veterinary Medical Association, 210.
Royal Scottish Veterinary Medical Association, 58.
Royal Scottish Veterinary Society, 381, 447,
Royal Society for the Prevention of Cruelty to Animals, 144.
Royal Veterinary College, 347.
Royal Veterinary College Medical Association, 450.
Scottish Metropolitan Veterinary Medical Society, 294.
Scottish Veterinary Association, 209.
South Durham and North Yorkshire Veterinary Association, 378.
Yorkshire Veterinary Medical Society, 61, 202, 441.

Production of Immunity from Contagious Diseases, 6.
Profession Becoming Overstocked? Is the, 391.
Prophylaxy of Bovine Contagious Pleuro-pneumonia, 233, 327,
Protective Inoculation, 151.

Prussic Acid from Various Plants, 228.
Purpura Hæmorrhagica, with Protrusion of the Eyeballs, 73.
Pustular Stomatitis of the Horse, 229.

Rabies and Muzzling, 309.
  Extinction of, 416.
  In Scandinavia, 261.
  In the United Kingdom, 71.
  In Turkey, 228.
  Protracted Incubation of, 71.
  Revived, 6.
Rectum, Abnormalities of, 313.
Remarkable Jump of a Horse, 468.
Reviews:—
  Diseases and Disorders of the Ox. George and Alfred Gresswell, 133.
  Hog Cholera: Its History, Nature, and Treatment. D. E. Salmon, 128.
  Physiology of the Domestic Animals. By R. M. Smith, 127.
  Text-book of Physiology. By J. G. McKendrick, M.D., LL.D., F.R.S., 337.
  Text-book of the Practice of Equine Medicine. By W. Robertson, Revised by J. Penberthy, 338.
  Veterinary Medicines: Their Actions and Uses. By Finlay Dun, 337.
Roux, M. Preventive Inoculation, 29.
Royal Agricultural Society, 67, 221, 459.
Royal College of Veterinary Surgeons, 46, 134, 339, 434.
Royal Counties Veterinary Medical Association, 210.
Royal Scottish Veterinary Association, 58, 381.
Royal Scottish Veterinary Society, 447.
Royal Society for the Prevention of Cruelty to Animals, 144.
Royal Veterinary College, 347.
Royal Veterinary College Medical Association, 450.

Salmon D. E. Production of Immunity from Contagious Diseases, 6.
Sanitary Police Half Measures, 82.
Scottish Metropolitan Veterinary Medical Society, 294.
Scottish Veterinary Medical Association, 209.
Seedy Toe, External, 159.
Skin Disease of the Horse, Contagious, 98, 187.
Skin Disease in Queensland, 229.
Small-pox Microbe, The, 469.
Smith, Fred. Animal Vaccination, 239.
Smith, S. M. Treatment of Bursatti by Sloughing, 325.
Snake in the Body of a Calf, A, 228.
South Durham and North Yorkshire Veterinary Association, 378.
Speed of American Trotting Horses, 225.
Steel, J. H. Fatal Disease among Goats in Khandeish, 153.
Strange Notions, 151,
Stuttgart Veterinary School, 225.
Suppurative Disease of the Face in Calves, 224.
Sustenance Requirements, 227.
Swine Fever, 67, 404.
Swine Plague, 469.
Swine Plague in Denmark, 390.
Symptomatic Anthrax, 224.
Synovia, Chemical Composition of, 317.

Texas Fever, 468.
Thiocamf, New Disinfectant Material, 200.
Thymus Gland, Calcareous, 444.
Tibia in a Greyhound, Fracture of the, 413.
Transport Damages, 227.
Tuberculosis, 203, 470.
  and Disposal of the Body of its Victims, 214.
  and the Contagious Diseases (Animals) Act, 440.
  Contagious Disease, 343.
  From a Sanitary and Alimentary Point of View, 393.
  History of, 312.
  in Animals, 209.
  Second Congress for the study of, 202.
  Transmission of, to a child by the Milk of a Tuberculous Cow, 335.
Tuberculous Flesh, 11.

Tumours of Bones from a Dog, 66.
Typhoid Fever in Dogs, 226.

Urinary and Generative Organs, Diseases of, 190, 261.
Uterus, Torsion of, and Puerperal Fever, 318.

Vaccination against the Siberian Pest, 308.
Vaginal Cysts, 390.
Veterinary Candidates, 390.
Congress at Paris, 455.
Crematories, 391.
Veterinary Profession and Tuberculosis, 333.
Research in Italy, 228
Surgeon, How to Become a, 392.

Walker F. Purpura Hæmorrhagica, 73.
Wild Animals, Destruction by, 148.
Williams W. L. Horse Syphilis, 11.
Wood-meal as Forage, 469.

Yorkshire Veterinary Medical Society, 61, 202, 441.

THE VETERINARY JOURNAL

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Annals of Comparative Pathology.

JULY, 1889.

REPORT OF A CASE OF MOLLUSCOID FIBROMATA IN A HEIFER.

BY AUSTIN PETERS, M.R.C.V.S.

I THOUGHT the following case might be interesting, as it is unlike anything I have ever seen before.

January 31st, I went to the farm of Mr. H., at Concord, Mass., the owner having requested me to come out there, a few days previous to the above date, to see a two-year-old Jersey heifer which had a lot of "little tumours on her belly, which look more like a lot of mushrooms growing upon her" than anything he could think of.

The heifer was indeed a sight to behold. The under surface was a mass of warty-looking tumours, hanging down several inches, extending forward to within three or four inches of the fore legs, and backward covering the udder, and extending some distance up the escutcheon. They were pedunculated, massed closely together, and varied in size from a pea to a hen's egg. Their surface was smooth and devoid of hair, and they looked very much like a cluster of small potatoes, or, as the owner suggested, "mushrooms," depending from the ventral surface of the body. I started to count them, but as I had to take a train back to Boston, found I had not time, but estimated their number at from six to eight hundred. I removed two or three of the largest by twisting them from their pedicles. When fresh cut in two with a knife, the cut surface presented a pearly, glistening appearance, and a quantity of serous fluid dripped from them; at the base, blood-vessels entering them could be clearly seen, which in dividing and spreading through the substance of the tumour gave a very pretty injection appearance. In some of them one or

two spots of extravasated blood were to be seen, due to rupture of small vessels.

Specimens of the tumours sent to the Pathological Department of the Harvard Medical School were pronounced by Dr. Sears to be Molluscoid Fibromata.

The growth has been very rapid, as it was not noticed until the animal was brought up from pasture last fall, and then looked like only a few small warts. A number of small warty growths had begun to appear on the under surface of the tail, on the near shoulder, and in places on both sides of the neck.

As I did not deem it worth while to try treatment, the animal was destroyed.

ASTHMA.

BY J. C. BERNE, V.S. (1ST CLASS), A.V.D., PORTSMOUTH.

A CASE which came under treatment at Hilsea on the 5th June, has convinced me that Asthma should be classified as a disease *per se* in the horse; and that, consequently, it is incorrect to make it a synonym for Broken-wind.

On this morning the patient, a grey mare over sixteen years old, was sent to the infirmary stables from the riding school, where she showed symptoms of great distress, leading to the opinion that she was suffering from congestion of the lungs.

When I saw her, one indeed would be inclined to think that this diagnosis was not far wide of the mark; for there were the hurried respirations and flapping nostrils, so far indicative of hyperæmic congestion.

Against this idea, however, I found that the pulse was comparatively undisturbed, numbering 47; temperature, $100\frac{4}{5}^{\circ}$; respirations, 32. These were of a wheezing character, simulating capillary Bronchitis; and there was a muco-purulent discharge from the nostrils. The mare had an anxious look, but not very pronounced, and when at times she went to the door of the box, she evinced rather a playful mood towards the patient in the one next to hers.

There was no change next day. On the 7th I was obliged to visit an out-station, and consequently did not see her that day; but on my visit next morning I found her all right—pulse, respirations, temperature, etc., normal.

The veterinary history sheet of the mare has no record of any previous attacks like the one under notice; nor any as affecting the air passages. From inquiries, I ascertained that during the past eight months or so she had been sent from the riding school

on account of her having shown symptoms which were marked by urgent distress. They passed off quickly, lasting only for a few hours, never for a day; and for this reason, I suppose, not brought under my notice.

That Asthma is a separate and distinct disease in the horse, must, I am of opinion, be recognised. In the symptoms I have given here, there is an absence of the most important features which mark congestion of the lungs; and the transitory nature of the illness puts it out of the question to identify it and Broken-wind as one. The treatment the mare received were occasional doses of spts. æth. nit., and spts. ammon. aromat.

CHRONIC LARYNGITIS.*

UNDER this title I shall describe chronic Laryngitis, considered as a termination of simple acute Laryngitis, and occasioned or kept up by obstructions of a glandular or other nature.

It is characterised sometimes by a mild inflammation of the mucous membrane with obstruction, or by ulceration of the tissues; sometimes by obstruction of the cartilaginous tube without apparent lesion of the mucous membrane.

Causes.—When chronic Laryngitis is a termination of simple acute Laryngitis we know the cause, namely, the use of some treatment not well indicated, or the neglect of treatment. Chronic Laryngitis is sometimes manifested after unskilful operations performed on the larynx, which have not been sufficiently successful to remove the cartilages, but have caused inflammation leading to the obstruction and welding of the cartilages together, and, in consequence, to shrinking of the tube. Chronic Laryngitis sometimes also results from glandular enlargements situated round the larynx.

Symptoms.—A short, whistling cough, which is produced without contraction of the larynx, acute at all times, but especially during deglutition of a large bolus and after drinking very cold water, is in most cases the only symptom of chronic Laryngitis, so long as it is still simple Laryngitis, and when the mucous membrane of the larynx has not undergone marked ulceration, when it has not become "enlarged," and has not caused contraction of the windpipe. If, on the contrary, it is aggravated in this way, besides the cough we find more or less troubled breathing, always a little noisy, even when the animal is asleep, and especially so if eating or moving. When the disease is further advanced the animal, even when well looked after, becomes emaciated, with a dry skin and rough coat.

* Translated from Cruzel's Treatise, by R. W. B.

But a pathognomonic symptom of this disease is that the muscles of the cervical region are more wasted than other muscles. I call attention to this symptom, because from the moment it is noticed no treatment is of any avail. All attempts at fattening and treatment will prove useless. This remark about loss of condition applies to all chronic diseases in cattle, and chronic Laryngitis which has lasted some months is nearly always complicated with Bronchitis of the same nature at first, but afterwards of a "tuberculous" nature. When there is thickening of the mucous membrane, it sometimes happens that the aggravation of the evil only slowly declares itself; cattle affected with wheezing sometimes seem to be in good health, and the wheezing does not appear to get worse. There are cattle which work all day, and whose breathing is noisy only when they are making great efforts; this wheezing may exist without there being evidence to show that there are lesions in parts of the respiratory passages other than the larynx. Often I have been called to diagnose the state of cattle affected with wheezing, which the owners suspected to be tubercular Phthisis. But I never found Phthisis and wheezing coexistent; yet I have found cattle which breathed hard when working, which were not phthisical. One such, which, having been the subject of a dispute, had been sold to the butcher at the end of a transaction which I had managed, showed a very apparent lesion in the larynx and a non-tubercular lung. If chronic Laryngitis is occasioned by the drawing together of the cartilages of the larynx or by their being blocked up, the cough has a peculiar character; it is produced by violent contractions of the muscles of the thorax. The breathing is whistling in character, even in sleep; but when the animal eats or works it is noisy and jerky. If Laryngitis is kept up by the pressure exerted on the larynx by obstructions which are developed in its circumference, the symptoms vary according to whether the pressure is continual or momentary. In fact, the growths adhere sometimes in such a manner to the subjacent or surrounding tissues that they exert constant pressure; when they are movable and are displaced by certain movements, their action not being the same, the symptoms are either mitigated or are aggravated. When the enlargement is not displaced the cough is incessant and the breathing always troubled; if it is easily displaced frequent manifestations of one or the other symptom are noticed. Sometimes these tumours are formed by fibrous connective tissue (*lardarcé*) without cavities; sometimes they have cysts in their centre, hollows divided by bands (*brides*); sometimes they are thyroid glands which, in consequence of a contusion or puncture, become indurated.

Progress. Duration. Termination.—Its progress is very slow; consequently its duration is long, or at least its duration would be

long if one had not the chance to make some use of the animal by handing it over to the butcher. As to its termination, it will be inevitably fatal in most cases, without the resource of which I have just spoken.

Lesions.—The *post-mortem* examination of animals which have died of this disease, or been sacrificed during its progress, shows redness of the mucous membrane of the larynx, and a softening or a thickening of this membrane. At other times the cartilages are enlarged and indurated, they are drawn together, and the glottis is more or less contracted. I have already mentioned the tumours complicating this disease.

Diagnosis. Prognosis.—It is characterised by few symptoms, very striking and, so to speak, isolated, and it is not difficult to distinguish it from other diseases of the air passages. It will suffice, in order to characterise it, to mention this whistling, jerking cough, noticed when the animal drinks or eats, or when made to walk fast.

The prognosis is grave, in so far as the disease nearly always proves fatal, or at least that its cure is difficult to effect, if it is not simply a modification of simple acute Laryngitis. If it is such a modification its prognosis is less grave, as it is then possible to overcome the disease by rational treatment, or at least to prevent its being an obstacle to fattening.

Treatment.—If it is simple chronic Laryngitis, friction sufficient to raise blisters over the region of the larynx may cause the symptoms to disappear; but it should be frequently resorted to, noticing the following indications: One should make (with tinct. canthar. blisters, or firing irons) one, two, or three applications, sufficient to blister the skin, to straighten the hair, and to raise the epidermis. This done, make no more "applications," as they would be useless or even dangerous; if irritant, they would raise a scar, which is to be avoided; if soothing, they would partly hinder the action of the blisters. If blistering ointment is used it should be applied with a spatula, in such a manner that the preparation may be entirely absorbed by imbibition, otherwise the ointment will roll over parts which one wishes to protect, or on other objects in reach of the patient. In other cases of chronic Laryngitis no treatment will avail.

Editorial.

RABIES REVIVED.

It would appear that we are once more in the middle of an agitation with regard to Rabies, and that attention is again aroused to the danger of having mad dogs running about the streets. It is somewhat painful to witness these periodical scares, which are not without some foundation, and to know that there should be no occasion for them if the central authority who has to deal with the contagious diseases of animals would only exercise the powers which are already possessed, and which, if insufficient for the purpose, can easily be added to, in order to stamp out the scourge throughout the United Kingdom. Notwithstanding all that has been said and written for so many years about the disease, it may be asserted that we are no more free from its dangers now than we were a century ago. Its control is left to the local authorities, who in some places may be very energetic in the measures they adopt, and quite as supine and indifferent in others. Consequently, Rabies is never absent from particular centres, and is always ready to become epizoötic when circumstances favour its recrudescence. The measures for its effectual extinction in these islands have been so often indicated by our profession, and are so well known to the Government, that its continued existence in the land is evidence of gross stupidity or heartless negligence. Not only are the lives of human beings imperilled, and deaths from an agonising malady recorded almost weekly, but dogs themselves and other creatures suffer, while dread of the canine species is engendered. The panics to which Rabies gives rise are the cause of great cruelty to dogs, and serious complaints are made on their behalf, because of the severity of the spasmodic but limited efforts made to suppress its outbreaks. But whenever the panics are allayed no more thought is bestowed on the matter until there is a fresh outbreak, when the same futile local measures, which produce a merely temporary subsidence of the contagion, are enforced; and so the affair goes on year after year, when the three kingdoms, by the operation of general measures which would cause but little inconvenience or hardship to man or beast, might be freed from it in twelve months. In some things we are not a very humane, sensible, or practical people, and Rabies is one of these.

DISCOVERY OF THE PRODUCTION OF IMMUNITY FROM CONTAGIOUS DISEASES BY CHEMICAL SUBSTANCES FORMED DURING BACTERIAL MULTIPLICATION.*

BY DR. D. E. SALMON, U.S. AGRICULTURAL DEPARTMENT, WASHINGTON.

At the meeting of this Association held in Buffalo in August, 1886, I had the honour to read before the Biological Section a paper entitled "Immunity from Contagious Diseases produced by Products of Bacterial Multiplication," and a second paper on "The Theory of Immunity from Contagious

* From the Proceedings of the American Association for the Advancement of Science, vol. xxxvii.

Diseases." In the first of these papers I gave a detailed statement of nine different experiments, in which forty-five pigeons were used. The results of these experiments, demonstrated incontestably that these birds, which were susceptible to the dose of $\frac{3}{4}$ cc. of hog cholera virus, might be made immune from this dose by hypodermic injections of sterilised culture liquid in which the germ of this disease had been previously allowed to multiply.

Nearly a year and a half after the reading of this paper (Dec. 25, 1887), MM. Roux and Chamberland, of Pasteur's laboratory, published a paper in the *Annales de l'Institut Pasteur* in which they gave experiments to show that guinea-pigs may be made immune from the effects of the *Vibrion septique* by inoculation with sterilised culture liquids in which this germ had been allowed to multiply previous to sterilisation. In a foot-note to this paper they say, "At the moment of going to press we read, in the Annual Report of the United States Department of Agriculture, that M. Salmon has succeeded in giving immunity to pigeons from Hog Cholera by injecting into these animals sterilised cultures of the microbe of this disease."

In an article in the *Annales de l'Institut Pasteur* of February 25, 1888, Roux publishes another article, showing that guinea-pigs may be made immune against the virus of symptomatic Anthrax by injections of cultures in which had been grown the *Bacterium chauvœi*, which cultures had afterwards been sterilised by heat. In the same number of this periodical MM. Chantemesse and Widal publish an article on "Immunity against the Virus of Typhoid Fever by Soluble Substances." In this article they make the following statement: "In 1886 Salmon rendered pigeons refractory to Hog Cholera by inoculating with sterilised cultures of the microbe of this disease. The experiment was of little weight (*était peu concluante*), because the pigeon is endowed with a feeble receptivity for this virus, and because the process of vaccination applied to pigs and other mammals completely failed. . . . There was wanting an incontestable experiment which showed immunity given to an animal species very sensitive to the virus by means of soluble substances secreted by this virus. This experiment and this demonstration are found in a memoir that MM. Roux and Chamberland published in the month of December, in the *Annales de l'Institut Pasteur*, on the 'Immunity against Septicæmia.' This work inaugurates a new era in bacteriology."

Hueppe, in an article in the *Fortschritte der Medecin* for April 15, 1888, takes up the history of the investigations of this subject, properly giving credit to my experiments, the first of which were reported conjointly with Dr. Smith before the Biological Society of Washington in February, 1886. He shows that the objection of Chantemesse and Widal is without foundation, because of the check animals used in our experiments.

There is still a determined effort being made, however, by the assistants of Pasteur to secure the credit of this discovery for the Pasteur laboratory. In a review of my investigations of Hog Cholera written by Duclaux, and published in the *Annales de l'Institut Pasteur* for July 25, 1888, the subject is again taken up, and a laboured effort made to show that my experiments were not conclusive. M. Duclaux begins his review by saying, "The works of M. Salmon on Hog Cholera are scarcely known in France, and appear to be known little better to the European public. There are two reasons for this. The first is that they have been published in an official report not found in commerce, and the copies which reach Europe generally go to be buried in the tomb of the ministerial archives, or in the grand mausoleums hostile to visitors that we name, in France, public libraries. The other reason, more personal to the author, is that he proceeds too much by that method of exposition which consists in pouring on the head of the reader the entire contents of his notes of researches, leaving him to make his choice among the materials which thus reach him without order and without measure. . . .

As I said in the beginning, they are not known in Europe, where they scarcely figure in the journals until after the tardy communication which was made in 1887 by MM. Salmon and Smith to the Washington congress. But had they been known sooner, they would not have been sufficient to rally the then hesitating opinion on the subject of vaccination by soluble substances. They exposed the flank too much to very legitimate objections."

Before considering the objection raised by Duclaux to the experiments themselves, I desire to call the attention of the Association to certain publications in which these experiments were referred to at considerable length prior to the meeting of the International Medical Congress at Washington. The first communication was read before the Biological Society of Washington, Feb. 20, 1886, and printed in volume iii. of the Proceedings. This paper was printed in full in the *American Veterinary Review* for May, 1886, and it was referred to at considerable length in an editorial printed in the *New York Medical Journal* of March 6, 1886. This paper contained our first experiments with sterilised culture liquids, and in it was given the demonstration of the principle, that immunity may be produced by the injection of soluble substances which result from the growth of pathogenic bacteria. The paper was confined to one topic, was concisely written, and occupied less than five pages, and consequently is hardly open to the criticism of M. Duclaux. The paper read before the American Association for the Advancement of Science in August, 1886, was printed in full in the Proceedings for that year, p. 258, and was also printed in the *Medical News* of September 18, 1886. It appears to me, therefore, that if the scientists connected with M. Pasteur's laboratory were ignorant of these investigations until after the meeting of the International Medical Congress in September, 1887, it is not because the literature was inaccessible.

MM. Chantemesse and Widal take exceptions to my experiments because pigeons, which were the animals used, were but slightly susceptible to the virus, and because this process of vaccination applied to hogs and other mammals had completely failed. It is somewhat amusing to find in the same number of the *Annales* a communication from M. Roux, of M. Pasteur's laboratory, claiming to demonstrate that immunity can be produced from *Charbon symptomatique* with soluble substances, and in which the investigation was made by experiments with animals even more insusceptible to this virus than were pigeons to the virus of Hog Cholera. Roux used guinea-pigs, and he tells us that " cattle and sheep are the animals that most easily take the *Charbon bactérien.* The guinea-pig shows more resistance to this disease ; it does not always die as the result of inoculation made with the pulp of the charbonous tumour. MM. Arloing, Cornevin and Thomas have made known a mode of inoculation which always produces death to guinea-pigs. To obtain this result it is sufficient to mix the virus with a solution containing twenty per cent. of lactic acid. With this means of proof there need be no fear of a failure of the inoculations or of seeing the control guinea-pigs resist them."

It is a rather peculiar idea to advance that we must receive without question experiments made in Pasteur's laboratory with animals so insusceptible that a foreign substance must be added to the virus in order to produce positive results, while exactly similar experiments must be rejected, when made in this country with virus to which it is not necessary to add any foreign substance, and which, under the conditions mentioned, never failed to produce positive results. This objection was apparently disposed of by Hueppe, however, when he called attention to the control experiments and the positive results of these inoculations.

The question is, however, apparently deemed of too much importance to Pasteur's laboratory to be allowed to rest here. In Duclaux' review a new

objection is relied upon to show that my experiments were valueless. It is that the liquids were sterilised at a temperature too near to the limit at which the microbe is destroyed. Duclaux claims that testing this liquid by adding a few drops to a fresh culture tube, in order to learn whether there are any living organisms present, proves nothing. "It was known," he goes on to say, "and it is still better known now, that microbes which are present in a culture are not identical, and that they have different powers of resistance to external agents. These powers of resistance are not identical, although approaching each other closely, and the more closely the more homogeneous the culture. Nothing proved then, and nothing proves yet, that all of the microbes were killed at this temperature limit of 58°-60°."

These objections were anticipated when our experiments were planned, and any one who will go carefully into the details of these experiments will see that the objections do not hold good. It is true that the temperature of 58°-60°, at which we sterilised our culture liquids, is rather near to the limit which is necessary to destroy all life in these cultures. While admitting that there may be different degrees of resistance with this germ, however, we demonstrated that 58° maintained for ten minutes was sufficient to destroy those germs with the greatest powers of resistance, because none were left capable of multiplying after they had been so treated. In our experiments on immunity we do not limit the cultures to a temperature of 58° for ten minutes; on the contrary, we increased the temperature one or two degrees, and we maintained this increased temperature for two hours—in other words, for twelve times as long as had been found necessary to destroy all living germs. It will also be seen, by reference to the details of our experiments, that in some of these the culture liquids employed were concentrated over a water-bath. In these experiments the culture liquids were heated to a temperature of nearly 100° for from one to two hours. This is far beyond the point where there could be any doubt of the germs being completely destroyed. While some of the experiments in which this evaporated virus was used were successful, we recognised the fact, apparently confirmed by the French investigations, that such a temperature weakened the power of the liquid for the production of immunity. We consider, therefore, that this objection of Roux is absolutely untenable, and that there can be no question that the virus was completely sterilised in our experiments.

As another reason for his belief, Roux cites the small quantity of sterilised culture which was sufficient to produce immunity. "Thus," he says, "in the first of these experiments published in the Report of 1885, a dose of $\frac{5}{10}$ cc. of vaccinal culture sufficed to confer almost complete immunity on a pigeon. This dose differs greatly from that which is necessary to confer immunity in other diseases." Roux evidently errs in this statement. By referring to the Report of 1885 it will be found that one pigeon received $\frac{8}{10}$ cc., and when inoculated with strong virus died in forty-eight hours, *i.e.*, this bird had no immunity whatever. Another one received 1·5 cc., and when inoculated with active virus was so affected that it lost the use of its legs, although it survived the inoculation. In this case there was evidently a partial immunity. All of the other birds referred to in that Report received over 3 cc. In our subsequent experiments we found that 2 cc. would generally confer immunity on pigeons, although in many experiments we used 3 to 4 cc.

When we turn to the experiments made in Pasteur's laboratory we find that this quantity is not so different from what was used there as we should be led to believe from the remarks quoted. For instance, while in the experiments of Roux and Chamberland, for producing immunity in guinea-pigs against the *Vibrion septique*, they used 120 cc. of culture liquid which had been heated to 105°-110°, they succeeded in producing equal immunity with doses of only 1 cc. of the serum from the muscles and cellular tissue,

which was sterilised by filtration instead of by heat. It would appear that the high temperature which they used for sterilising their culture liquids destroyed to a certain extent the activity of the substance which produced immunity, just as in our experiments a still lower temperature had such an effect. If doses of 1 cc. of filtered serum, repeated seven or eight times, are sufficient to produce immunity in an animal of the size of a guinea-pig, which weighs from 400 to 500 grammes, it is not surprising that an equal dose of sterilised culture liquid, repeated twice, should be sufficient to produce immunity in a pigeon which only weighs from 200 to 250 grammes. Roux also succeeded in producing immunity in guinea-pigs against symptomatic Charbon by doses of 1 cc. of filtered serum repeated from ten to twelve times. With these experiments before him we are surprised that Duclaux should raise this objection as to the size of the doses of sterilised culture used in our experiments.

The final objection raised by Duclaux is that this method of vaccination had failed with the more susceptible animal species; that it succeeded only with the pigeon, a species on the marginal line of immunity; and that this mode of vaccination succeeded better in winter than in summer, and that even in winter there are some failures. It is true that our experiments failed with large animals like pigs, which are more susceptible to the disease, but this has no bearing on the demonstration of the principle. With these large animals, and especially in this disease, there are other difficulties to be overcome. The large size of the animal requires a great increase in the amount of the material used, an amount for the determination of which sufficient experiments have not been made. Again, the manner in which the virus is introduced into the body under natural conditions has a very important influence. Indeed, it is doubtful if the immunity of pigs can be artificially raised to such a degree as to prevent the multiplication of the germs on the mucous surface and within the walls of the intestines, and the formation of those large ulcers which are characteristic of the malady and are usually fatal. It is not to be forgotten that M. Roux has not published any experiments in which he has succeeded by this method in conferring immunity on cattle or sheep against symptomatic Anthrax; but I have not heard of this being urged as an objection to the conclusions from the experiments on immunity with guinea-pigs which he has published.

Duclaux is wrong in supposing that our experiments only succeeded with pigeons in winter. We did not make this statement. Pigeons are more susceptible to the virus of Hog Cholera in winter than in summer; consequently we selected winter for the experiments, because at that time our control experiments with unprotected birds were successful. It is true that some of our experiments failed, but I imagine no principle has been worked out experimentally in which all the experiments from the beginning were successful. It was necessary for us to determine experimentally the dose which was to be given to produce immunity and the number of times it was necessary to repeat the dose. We also endeavoured to learn the effect of a boiling temperature on the soluble substances produced in the cultures of this germ, and the high degree of heat is responsible for the failure of some of the experiments. It also required some experimenting to learn that pigeons are more susceptible in winter than in summer. We published all of our experiments. M. Roux avoids the charge of failure by publishing only successful experiments. Taking all these facts into consideration, it must be admitted that our experiments published in 1886 were successful, and that they demonstrated the production of immunity by soluble substances contained in the culture liquids in which the germ of Hog Cholera had multiplied. I therefore continue to claim priority for this important discovery.

TUBERCULOUS FLESH.

AFTER a long and patient investigation in Glasgow by Sheriff Berry, and the examination of many medical men and veterinary surgeons, with regard to the question whether or not the flesh of cattle affected with Tuberculosis in any degree was fit for human food, the Sheriff has decided that such flesh should not be offered for consumption. The inquiry was instituted at the instance of the Local Authority, who had taken proceedings against two meat salesmen for exposing such flesh for sale. All the veterinary surgeons were in favour of the interdiction of the flesh of tuberculous cattle as food, and only two or three medical men asserted that it might be so utilised.

HORSE SYPHILIS OR MALADIE DU COÏT.*

BY W. L. WILLIAMS, V.S., ILLINOIS, UNITED STATES.

I HEREWITH submit my report upon the outbreak of Equine Syphilis, Maladie du Coït, or malignant Venereal Disease of Solipeds, which has been lately brought to notice in De Witt County, Illinois.

This being the first well-authenticated outbreak of this disease, so far as known, in any English-speaking country, renders a thoroughly complete and accurate report both difficult and desirable, the English veterinary literature upon this subject being practically all translations from foreign languages, and in most cases very meagre in detail and inaccurate in many important particulars. From such as exist, however, I have not hesitated to draw freely whatever seemed of value, and acknowledge with pleasure the assistance derived from Dr. Fleming's very able and exhaustive treatise in his "Veterinary Sanitary Science and Police," from which, although differing radically from him in some important particulars, I have not hesitated to copy or condense the general history of the disease and his table of synonyms, and in nearly every part of the work have freely drawn whatever seemed of value to my purpose.

I acknowledge also with pleasure many kind and valuable suggestions regarding the work by Professor Law and Dr. Casewell.

SYNONYMS.—Technical: *Lues Venerea Equis*, *Frambœsia Morbus Pustulosus*, etc. French: *Maladie du Coït*, *Maladie vénérienne des Solipedes*, *Maladie paralytique du Cheval*, *Paralysie Epizoötique*, *Paraplegie Epizoötique*, *Morve de l'Appareil de la Generation*, etc. German: *Exzemausschlag*, *Chankerkrankheit*, *Gutartige Beschälkrankheit*, *Bosartige Beschälkrankheit*, *Pseudo-syphilis*, etc. Arabic: *El Dourine*, *Dourine* (Fleming).

HISTORY AND GEOGRAPHICAL DISTRIBUTION.

The earliest account of the disease known is that by the German veterinarian Ammon, who witnessed it in 1796 and 1799, amongst stallions and mares in Trakehnen, North Prussia, where it persisted until 1801, and reappeared six years later; but the disease was probably known at a much earlier date in Southern Russia. It appeared in Austria in 1815, and in Hanover in 1816, where it spread and prevailed until 1820-21. In 1821 it appeared in Syria and Silesia, reappearing in the latter country in 1826.

From 1827 to 1830 it caused great mortality in Bohemia, and in 1830 the

*"Report on the Outbreak in Illinois, to the State Board of Live stock Commissioners," reprinted from the *American Veterinary Review*.

disease appeared in Berne, Switzerland. From 1833 to 1836 the disease raged in Upper Silesia, and again in the same province in 1840-41. Horse-breeders had now become so thoroughly alarmed that careful investigation by veterinarians and severe legislative enactments soon checked the ravages of the disease in Germany.

In 1847 Signol saw the disease in Algeria, where it caused a loss of 600 horses, and other writers mention the occasional apppearance of the disease in the North African States.

In the spring of 1851 the disease broke out for the first time in France, in 31 communes around Tarbes, containing 1,874 mares, and out of 750 mares bred to government stallions 100 became diseased, and an additional 27 mares became diseaséd by private stallions; 52 of the affected mares died, and the disease almost entirely disappeared during the following year, only to reappear in 1856, 1857, 1858, and 1861. The disease was directly traced to stallions imported from infected countries in 1851 and 1861.

"This is, as far as I can trace it, the geographical limit of this curious disease. It has not been witnessed as yet in England, Belgium, Italy, Spain, or Denmark, nor in countries beyond Europe, Asia, or Africa, so far as I am aware, but there can be no doubt but that if diseased stallions or mares are imported to those regions now exempted from its effects it will appear there, as it has done in Russia, where it is frequent and violent, particularly in the southern governments—Germany, Hungary, Bohemia, and France." The above history, abbreviated or quoted from Fleming, demonstrates to some extent the serious nature of the malady, the probable source of the disease in America, and the importance of dealing with it in a prompt and decisive manner.

The History of the Disease in De Witt County, Illinois,

and its source of origin, were for a long time somewhat obscure, but now seem reasonably clear. Three sources of origin have been suggested. *First*, it was supposed that the disease was introduced direct from France by Harrold and Culbertson, of Wapella, in January, 1884, when they imported nineteen French draft stallions, aged from eighteen to thirty months, all of good quality and showing no evident sign of disease.

In 1884 one died from injuries in transit, and three were sold, which, so far as can be learned, remained free from the disease. In 1885 one died from unknown cause, and one was sold to parties who in turn sold him to W. R. Carle, of Wapella (No. VIII),* and two (XII and XIII) were sold to Foley and Seniff, of Wapella.

In 1886 two horses died, one probably of venereal disease, the other from unknown causes, and two were sold to California parties, which are reported well.

In 1887 there remained seven horses, six of which were used on the Harrold and Culbertson farm, and all badly diseased, while the seventh horse was used for stud purposes at Danvers, Ill., and remains sound.

In April, 1884, Harrold and Culbertson brought from Texas 236 select western horses, about 170 of which were pregnant mares, which afterwards dropped and reared healthy foals.

These mares were then bred promiscuously to such stallions as were on hand in the years 1884 and 1885; nearly all the mares were impregnated and dropped healthy foals, which remain on the farm. In addition to these mares, the stallions were allowed to serve such outside mares as were offered. No signs of disease were noticed in 1884, but in 1885 it would

* Numbers refer to tabulated list of affected and exposed stallions and mares.

appear that at least one outside mare, and probably a few on the farm, developed the disease, but being wholly unheard of and unexpected, no special notice was taken of it until the spring of 1886, when the disease assumed such alarming proportions in both mares and stallions that all breeding was discontinued on the Harrold and Culbertson farm. The objections to this theory of origin are, 1st, the stallions were too young to have been used extensively for stud purposes, and hence unlikely to have been affected prior to importation; 2nd, with the exception of VIII, XII, and XIII, which were kept in the neighbourhood, all stallions sold from the farm have, so far as known, remained healthy; 3rd, they made the season of 1884, serving promiscuously a large number of mares without producing the disease, and again in 1885 without affecting a sufficient number of mares to cause alarm.

A second theory of origin is by means of Texas mares, either from having been affected upon their arrival or generating the disease spontaneously by haphazard copulation.

Spontaneous origin being wholly unknown in other specific contagious diseases and the past history of Equine Syphilis in other countries, where it has always been traced to the importation of breeding animals from an affected district, should prove sufficient to dismiss the idea of spontaneity, while the fact that the disease, so far as can be learned, is wholly unknown in Texas, and that all Texas mares brought to De Witt County were doubtless well until after being bred to affected stallions, should set at rest this theory of origin.

The third and most tangible theory is that the disease was introduced direct from France, by the imported brown "Moore" horse (No. XV), now owned by J. Fisher, Clinton, Ill., imported in 1882 by Benson and Knapp, Monticello, Ill., at the age of three years, sold in spring of 1883 to Moore and Son, Clinton, Ill., and by them was placed in the stud near Clinton, serving a large number of mares besides those belonging to his owners, a fair percentage of which became impregnated and dropped healthy foals. In 1884 he was continued for a time in the stud without any complaint from patrons, but before the season was far advanced the horse became unwell. The genital organs became swollen and the penis sore in several places. At the ring of the penis (preputial ring) there was sufficient ulceration to destroy the ring at the front part. At the upper part of each flank there were extensive ulcerating sores, which healed tardily, leaving large unsightly scars. On the left side of the crest of the neck there appears a very plain brand, of the letters "D N," which I am reliably informed by Prof. Law and Dr. P. Paquin unmistakably indicates that this horse had been condemned by the French veterinary authorities for Maladie du Coït. The horse was sold, some time after the development of the symptoms of disease, for a merely nominal sum, as a seriously diseased stallion, to his present owners, after having been taken from the stud and treated for his malady with indifferent results, and in 1886 and 1887 the horse's services were offered to owners of mares, but only a limited patronage was obtained. Nothing particularly further was thought of the matter until the disease broke out in alarming proportions, and inquiry was instituted to determine its origin, when it was learned that in 1883 Milton Chapin bred two black mares to the Moore horse, and disposed of one to Sandusky Wilson, and the two mares were bred in 1884 to Utopia (XII) before he was sold to Foley and Seniff. It is now said that one or both of these mares were affected with Equine Syphilis when bred to Utopia, and that they had contracted the disease from the Moore horse in 1883. Certain it is that the Wilson mare was bred to the Moore horse in 1883, and to Utopia in 1884, and that she was seriously diseased in 1884, undoubtedly of Equine Syphilis, partially recovered, was sold to a Mr. Yakle, of Waynes-

ville, Ill., and by him to an unknown shipper. The other Chapin mare was traded to itinerant horse-traders, and was soon lost sight of, but being at that time twenty years old, or more, it is probable that she is ere this dead.

Returning, then, to Utopia, after having served the Chapin and Wilson mares, he was kept in stud by Harrold and Culbertson, serving among others the "Marvel" mare (No. 383), and was sold apparently sound, in March, 1885, to Foley and Seniff, and proving unequal to the demand, Black Brilliant (XIII) was purchased of Harold and Culbertson to assist, and he proving unsatisfactory, was exchanged, June, 1886, for Perie (III).

During the summer of 1885 Utopia served about sixty mares, without, so far as learned, diseasing any, and in the fall of 1885 he served some twenty mares, of which a few proved in foal, while some fifteen of them became affected, nine of which have died, and the others have mostly partially recovered, some of them scarcely showing any trace of the disease.

Here matters were allowed to rest apparently quiet until early in April, 1886, when the disease had assumed such alarming proportions in Wilson township that Messrs. Foley and Seniff asked me to see their stallions and some of the affected mares and advise with them as to the proper course to pursue. I examined six or eight mares affected since the fall of 1885, all exhibiting the constitutional symptoms of the disease as hereafter described.

The two stallions were carefully examined, Black Brilliant (XIII) appearing perfectly sound, and Utopia (XII) well except a slight swelling and redness of the urethral opening in penis and a slight dirty-brownish watery discharge from the urethra, which might occur in any stallion without attracting special notice. Not being fully aware of the extremely insidious, misleading, and serious nature of the disease with which I had to cope, and hoping that the disease could be successfully confined to its then apparent narrow scope, I advised that Utopia should be withdrawn from the stud until all symptoms of disease should disappear, prescribed such treatment as I thought best for both mares and stallion, and as the other stallion (Black Brilliant) exhibited no signs of disease, I advised that he be continued in the stud. The affected animals apparently improved for a time, and I saw them once more in April, at which time I made some immaterial changes in the treatment; and here my personal observation of the disease ended until renewed by your directions in May of the present year. My second visit, in April, 1886, brought me to a more full realisation of the dangers to our horse-breeding interests from this disease, and accordingly I reported the matter briefly to you under date of May 1st, 1886.

Verbal reports of the spread of the disease in De Witt County reached me occasionally during the summer and fall of 1896, until early in 1887 the accounts became so alarming that I reported the matter more fully to you and urged decisive action.

Returning to the Harold and Culbertson farm at the date of sale of Utopia to Foley and Seniff, it seems that Utopia previous to his sale had infected some mares without attracting the attention of the owners, which in their turn transmitted the disease to other stallions, and thus the malady continued to spread, unobserved in 1884, suspected in the autumn of 1885, and asserting itself positively in 1886.

The totally unknown and unsuspected nature of the affection, with its long periods of incubation, latency, and want of such pronounced symptoms in its earlier stages as we usually expect in a deadly contagious disease, readily allowed it to gain a disastrous hold unobserved, or at least unrecognised.

Previous to the general recognition of the dangerous character of the

disease the usual traffic in horses went on uninterrupted, so that a number of exposed mares, and certainly two or three diseased mares, were disposed of ere the public was aware ; but fortunately it seems that only a very few of actually diseased mares changed hands, and nearly all of these have been found and safely quarantined, and the others traced to dealers' hands, from whence in all probability they went to our large cities or northern pineries for draft work, where they are not likely to ever again be bred. But some of the affected mares were unfortunately bred to neighbouring healthy stallions, and in this way the disease was communicated to XVIII by a mare bred early in 1886 to XII-XIII, by Henry Bell, of Wilson township, and to XVII by a mare bred by N. Foley in fall of 1885 to XII-XIII, and afterwards sold to Kelly and Waters, and by them bred to XVII in 1886 and 1887. Were it possible to trace the history of every affected animal, we should doubtless find all cases emanating from one source of origin ; and from the evidence now at hand it would seem that the most probable source of origin of the present outbreak is the Moore horse (XV). Bearing in mind the history of the disease in the old world, we should naturally look to some imported animal for our source of infection ; and since practically the only horses we import from a country known to be infected are those from France, we should consequently expect to trace the disease either directly or indirectly to that country.

Character.—There exist almost as many definitions for Equine Syphilis as there are different writers upon the subject.

The name Maladie du Coït signifies merely that it is a disease contracted by copulation, while in fact there is at least one other venereal affection of solipeds (horse, ass, etc.), which might as properly be termed Maladie du Coït as this disease.

English writers translating from German, French, and other foreign languages, refer to a benignant and a malignant form of the disease, but from my experience with venereal diseases of horses in the past, as well as from observations in the present outbreak, I am obliged to take exception to the generally accepted ideas of English writers and translators, and separate the so-called benign form from the disease under consideration as a wholly distinct venereal disorder, the reason for which I shall more fully allude to later, and we therefore prefer to discard the term Maladie du Coït, and follow the nomenclature of writers of human medicine, denominating the fatal constitutional disease under consideration Equine Syphilis, resembling closely, as it does, the Syphilis of man, and applying the name Equine Chancre or Chancroid to the benign, local, eruptive venereal disorder which closely resembles the soft or non-syphilitic Chancre or Chancroid of man in many of its characteristics. From the above standpoint, then, Equine Syphilis may be defined as a malignant, specific venereal disease, peculiar to solipeds.

The nature of the disease is not thoroughly understood, some believing it to be a neurotic (nervous) affection, while others, noting the very common changes in the lymphatics, designate it a lymphatico-nervous disease, etc. Others, relying on some similarity of symptoms and pathological changes, believe it identical with or closely allied to human Syphilis. But the mercurial treatment so efficacious in the Syphilis of man seems inert in this disease ; the symptoms of the two disorders, while resembling each other in some respects, yet differ widely in many very essential particulars, and furthermore, carefully conducted experiments of Horand and Peuch, of Lyons, demonstrate that human Syphilis is not transmissible to solipeds.

" Without entering, then, into any further discussion of the views entertained with regard to the nature of the disease, we may at once aver that no definite conclusion can be arrived at, and we must be content with the state-

ment that it is an eminently virulent malady of specific nature, generally marked at first by local signs, and subsequently by constitutional derangement of a grave character" (Fleming).

Causes.—Various authors propound diverse theories as to the primary cause or causes of the disease, but each fails to produce a tangible origin. Amongst the proposed causes may be mentioned atmospheric conditions, faulty hygiene or dirt, too frequent copulation or too frequent sexual excitement without sexual contact, crossing of breeds, vaginal catarrh in the mare, etc. But these influences have existed as long in countries where the disease is unknown as in those where it has prevailed for nearly a century or more, without producing the disease.

Others have imagined its cause to be the fornication or bestiality of Syphilitic men with the female ass, as is doubtless practised by Arabs, in the belief that this bestiality will cure them of their malady, and thence from the ass to the horse by copulation; but against this theory stands the objection already mentioned, that human Syphilis is not transmissible to solipeds.

Symptomatology.—Holding that the so-called benign form of the disease, as described by English authors, is a wholly distinct venereal disorder, there is no necessity for detailing here the symptoms of this affection, but I will follow the description of their so-called malignant form, noting such differences as may have presented themselves in the present outbreak. It may be stated, however, that in the so-called benignant form authors describe essentially the same local symptoms as in their malignant type, but assert that these symptoms remain purely local, and are followed by recovery in two to eight weeks.

Symptoms in the Mare.—In a variable length of time after copulation, usually eight or nine days, the mare exhibits uterine excitement resembling exaggerated œstrum (heat), the vulva becomes swollen, the mucous membrane of the vulva and vagina is reddened, and there is a vaginal discharge of at first a serous nature, which soon increases, becomes thicker, sticky, viscid, and white, yellow, greyish, or reddish in colour, which collects about and soils the tail and perinæum.

The mare is restless, as evinced by occasional stamping with the hind feet. The urine is voided frequently, in small quantities, its passage irritating the already congested or inflamed vaginal mucous membrane, causing increased restlessness. The vaginal mucous membrane continues to grow more irritable, and the colour becomes a deeper red. The lips of the vulva become more distinctly swollen, the swelling being of an œdematous (dropsical) nature.

Eruptions.—"At this time there appears on the mucous membrane of the vagina, vulva, and clitoris small miliary pustules, which soon become little superficial ulcers, no more than one-fifth of an inch in diameter. These ulcers are not long in cicatrising, but they are replaced by others, which, like the first crop, are most numerous in the fossa navicularis, on the clitoris, and near the margin of the vulva; the symptoms are intermittent, disappearing for some days and again manifesting themselves, in the majority of cases becoming milder, until they finally disappear" (Fleming).

Unfortunately, we have not enjoyed the privilege of seeing cases of less than several weeks' standing, but in none of these have we seen the pustules and ulcers above described, nor have we noticed any changes or appearances in the parts that would suggest the prior existence of such eruptions, neither can we learn from the many intelligent horse-breeders who have had abundant opportunities for close observation that such eruptions have occurred to that marked extent described by Fleming and others in the present outbreak; and since Fleming, as previously quoted, describes these pustules and

ulcers as occurring more particularly in the so-called benign form, we may well doubt, if not wholly deny, the occurrence to any marked extent of any such eruptions in the affection under consideration, especially when we remember that such eruptions do occur in abundance in the benign venereal disease, with which English authors so hopelessly mix the true Equine Syphilis.

If any eruptions at all have occurred in the present outbreak, they have been entirely within the vagina, very few in number, and of very brief existence, and not generally noticeable to an ordinarily close observer.

The swelling of the lips of the vulva is intermittent and variable, extending sometimes downwards along the perinæum to the mammary region (udder), and is occasionally more marked in one lip of the vulva than in the other giving it a deformed appearance. The mucous membrane of the vagina is red, swollen, and wrinkled, appearing unnaturally rough to the eye. English writers describe the frequent occurrence, on the external surface of the lips of the vulva, on the perinæum and inner face of the thighs, of lenticular pustules, succeeded by readily healing ulcers, but no such eruptions have occurred in the present outbreak.

There does occur, however, in a large proportion of cases, a peculiar loss of pigment in the skin of the vulva, perinæum, and anus, beginning usually in spots of variable size and shape, gradually enlarging and coalescing until the entire vulva, perinæum, and anus may be one continuous white patch, with irregular border, or dotted over with white spots varying from one-fourth to one inch or more in diameter. The vaginal discharge may vary greatly in amount, and may cease after a few months, or may persist for a year or more, is usually dirty white or greyish in colour, frequently possesses an offensive odour, becomes viscid and glutinous, adhering to and irritating or excoriating the adjacent parts.

Coitus increases the vaginal discharge, as well as aggravates in every way the symptoms of the disease. In many cases there is a marked loss of power in the vulva and vagina, causing an involuntary discharge of accumulated matter from the vagina during sudden exercise.

Incontinence of urine has been noted in a well-marked case of fifteen months' standing, which, added to the catarrhal discharge, and adhering to the tail and thighs, made a very repulsive sight.

The most constant and persistent symptoms noted in the present outbreak are the changes in the vulva and clitoris.

The margins of the vulva lips lose their black pigment early in the disease, and it is not replaced until after the white spots on the external parts of the vulva, on anus, perinæum, and under side of tail have wholly disappeared, which usually occurs after six or eight months. The vulva shows a marked tendency to gape, especially at its lower commissure, due partly, doubtless, to a loss of power in the vulva itself, but mainly to the enlarged clitoris pushing the lips apart, this gaping giving the appearance of extreme age to a young mare. The clitoris is quite uniformly enlarged, exhibiting a smooth, shining surface, wholly devoid of pigment and unnaturally dry, there appearing to be a destruction of the mucus-secreting glands of the clitoris and fossa navicularis, or at least a temporary destruction of their secreting power.

Infected mares rarely conceive, and the few that do almost invariably abort by the sixth month, and in case the foal is carried to the full period it is almost sure to be weakly and short-lived. There is frequently considerable pruritis (itching), as evinced by rubbing of the tail and hinder parts and licking or biting various parts of the body. Comparatively early in the course of the disease there are frequent œdematous swellings of the legs and abdomen.

The inguinal glands may enlarge and even suppurate, and the mammæ (udder) occasionally enflame and enlarge. Enlargement of the submaxillary glands (the glands between the angles of the lower jaw) is frequently present, and in some cases there is seen a viscid, sticky discharge from the nostrils, closely resembling Glanders, which resemblance is heightened by the appearance on the nasal membrane of small superficial erosions or ulcers, and usually associated with the nasal discharge there is observed also a mucupurulent discharge from the eyes.

In the present outbreak, as in those described by German writers, there occurred frequently, suddenly appearing, sharply defined, circular or various-shaped flattened swellings, one, two, or even six or seven inches in diameter, hard and unyielding to the touch, sometimes painful upon manipulation, at other times causing pruritis, as is indicated by the animal licking or biting at the affected parts. These swellings may appear at any time from eight to ten weeks to the end of the disease, and may disappear as suddenly as they came, and others may appear in other parts of the body. In nearly all cases, as the disease progresses, there appear signs of weakness and paralysis, mainly of the hinder parts, at first exhibiting an unsteady gait, the animal bringing the hind feet forward in a difficult, uncertain manner, usually dragging the toes along the ground, or at least striking the ground at the middle of the stride, and in bringing the foot to the ground placing the toe down first, with the fetlock flexed, which is then extended suddenly as the heel is brought down. This imperfect action may be seen in one or both hind limbs, or may appear first in one, then in the other, then in both, persist for a few days, then disappear entirely, or nearly so, and then return again worse than ever.

Sometimes this lameness is of a spasmodic nature, somewhat resembling Stringhalt, the hocks being suddenly flexed and carried forward with a jerk. As the disease advances the lameness usually increases, the back becomes arched, and the hind feet are dragged along the ground, until finally the paralysis becomes so severe that the animal is unable to rise when down, and in their struggles to get up it is said that fractures sometimes occur in the bones of the loins or hips. Emaciation usually begins early in the disease, and increases rapidly when the paralytic symptoms develop, until the animal soon presents a hideous sight, the whole body being wasted to a mere skeleton, in spite of the fact that the appetite remains unimpaired to the last, and the food appears to be well digested. Late in the course of the disease there is occasionally seen paralysis of a lip or an ear.

Death may be due to a gradual giving way of the animal powers from the extreme marasmus, or to pneumonia, or other accidental complications.

In the Stallion

the general symptoms are essentially the same as in the mare, so we shall need mainly to consider the local manifestations of the disease in the genital organs. Its commencement is far more insidious in the stallion than in the mare, being in many cases wholly unrecognisable for months. Sometimes the symptoms appear early, while in other cases the development of the disease is tardy, and apparently unnoticeable; or the primary symptoms may appear for a few days or weeks, then disappear entirely, and the stallion remain apparently well for months, although he is returned to the stud (which doubtless aggravates the disease), and yet be capable of transmitting the malady at least six months later, probably several years, without affording other evidence of disease. Usually the first noticeable sign of disease is a well-marked peculiar swelling of the prepuce, of an indolent, doughy nature, which may extend forward to and implicate the anterior part of the sheath,

and backward to and including the scrotum, the skin being thickened, smooth, and shining. These symptoms may disappear entirely in a few days to a few weeks, and leave no tangible trace of the disease, except the power of transmitting it to other animals, or it may remain for some months or years, either to be complicated with, or succeeded by, other symptoms.

It may be, as stated by most writers, that some stallions do not develop these primary tumefactions, but there is certainly good reason to suspect that, in many of the extremely occult cases these primary symptoms *did* appear at first, but were attributed to accidental local injuries, such as often occur, passed almost unnoticed, and were soon forgotten by the attendant; months go by, and the stallion resumes his work the following year, only to transmit the disease to some of the mares he serves, or by excitement of copulation to develop the characteristic signs of the disease. At this early stage of the disease, most writers, but not all, describe erosions and eruptions upon the prepuce, penis, and sheath, and some eruptions are said to have been seen in the present outbreak, but they were of a very insignificant character, few in number, no successive crops, and all disappearing quickly, leaving no noticeable scar. In most cases no erosions or eruptions were noticed at all, and in others they were probably due, to a great extent, to accidental abrasions, or erosions due to contact of the discharge from the urethra with the eroded parts, which were usually the penis and prepuce about the preputial ring.

The sheath may or may not become swollen, the swelling may disappear early, or may persist throughout the disease, the swelling when present varying in size, susceptible to unaccountable turns of growth or subsidence, and partaking of the same peculiar indolent character as the swellings of the prepuce, or may be indurated and hard from the presence of suppurating lymphatic glands.

The testicles are in most cases unusually pendent, from paralysis of the cremastic muscle, but in some cases they lie close against the external ring, when greatly atrophied, or may even be pushed up into the ring by abscesses or indurations of the lower part of the scrotum. In size they may be normal, enlarged, or atrophied. In the earlier stages enlargement is probably the rule, but in the later stages atrophy is almost constant, and when apparent enlargement does occur it is generally due, not to enlargement of the testicle proper (*parenchyma*), but to a thickening of the coverings of the testicle. In consistency the testicles are almost always soft and flabby, with an indefinite contour when manipulated.

The penis is said to be sometimes hypertrophied (enlarged), and sometimes atrophied (wasted), but in the present outbreak no marked deviation from the normal size has been noted. Writers also generally mention that in some cases the mucous membrane of the penis may be unnaturally red, or be the seat of bluish or violet elliptical patches, or of yellowish-white marks, probably the result of pre-existent eruptions, none of which have been noted in the present outbreak. In a large proportion of cases there is a loss of retractile power in the penis, so that it usually hangs partly out of the sheath, in the prepuce, or in extreme cases it may hang at full length entirely out of the prepuce, wholly powerless.

The sexual desire usually remains unimpaired throughout the disease, and in many animals the power to copulate is but little impaired, but in the earlier stages, during the tumefaction of prepuce and penis, either from excessive erection or other cause, the stallion fails in many cases to effect coition, and late in the course of the disease the same inability may arise from loss of power in the penis, or from the extreme paralysis of the posterior parts.

The urethral opening may be normal or abnormally red and swollen and

in some cases there is a muco-purulent discharge from the urethra, while in others there are occasional involuntary emissions of semen, mixed with mucus and pus, containing a few dead or very inert spermatozoa. *Urination* is usually frequent and attended with some pain, and the urine may vary from normal to thick, yellowish, viscid, etc., or be mixed with mucus or pus from the urethra. In some cases polyuria or diabetes is well marked.

Emaciation, with dry, staring coat, is noted in a majority of cases as the malady advances, but is not uniformly seen, and is usually of a more or less intermittent character, progressing rapidly for a time, then halting, perhaps improving, when the emaciation again sets in with increased virulence, being especially marked in the hind quarters. The symptoms of paralysis and intermittent lameness in the posterior parts appear much the same as in the mare. There is a swaying, unsteady gait, as if the loins were affected, lameness in one or both hind legs, and a jerky, string halt-like gait.

Some authors mention that in some cases there appear peculiar epileptiform convulsions in the stallion when approached by a mare, in which the stallion is seized with spasmodic trembling, rigidity of the muscles of the neck, convulsive shaking of the head, dilatation of the eyes and nostrils, rolling of eyeballs, etc. In one stallion (VIII) there was a marked loss of voice, an excessively glutinous nasal discharge, large nodulated submaxillary lymphatic glands, and distinct superficial erosions on the nasal mucous membrane.

Pruritis is usually more marked in the stallion than in the mare, causing him to rub or bite violently the feet, pasterns, or other affected parts, producing large, unhealthy sores. The elliptical welt-like swellings of the skin are usually also more marked in the stallion than in the mare. There is also a strong tendency to suppuration of the inguinal and scrotal lymphatic glands. The inguinal glands, in some cases in the present outbreak, were the seat of extraordinarily large abscesses, in some cases filling up the entire groin and causing excessive swelling of the scrotum, extending down almost to the hock joints, and when the abscesses finally ruptured they discharged near a gallon of thick, curdled pus. The lymphatics of the sheath and scrotum were still more prone to suppuration, but the abscesses were tardy, indolent, and usually not very extensive, but their presence frequently caused extensive indurations, pushing the testicle upwards towards the inguinal ring, and occupying the ordinary position of the testicle, could be readily mistaken for that organ. In one stallion (XVIII) there is marked paralysis and atrophy of the extensor muscles of one forearm (*extensor metacarpi magnus* and *extensor pedis*, which may be due to the disease, but more likely to accidental injury.

Course and termination. The course of the disease is very prone to remissions and exacerbations, progressing slowly in the majority of cases to a fatal termination.

Recovery may and does occur, even after extreme emaciation, and when paralysis has been so complete that the animal could not rise without assistance.

The duration of the disease may extend from three months to as many or more years, and recovery, either apparent or real, take place at any intervening time.

Pathological Anatomy.

In animals which have succumbed to, or been destroyed in the last stages of, the malady, there is seen quite uniformly an evident degree of anæmia and emaciation. Distributed throughout nearly every tissue in the body there is found a characteristic yellowish deposit of gummatous materials, bearing a close resemblance to the gummata of human syphilis, especially abundant in

the subcutaneous and intermuscular connective tissue, and nearly every organ of the body partakes of the general yellowish tinge.

The muscles, especially those of the thigh and croup, are pale and soft, sometimes showing marks of fatty degeneration.

The bone tissue is fragile, and both cancellated tissue and medulla show large brown patches.

In each autopsy made the coxo-femoral articulations (hip joints) were found much altered, their ligaments enlarged, softened, and congested. Other observers state that in some cases these ligaments become so fragile from disease that they are sometimes ruptured.

The synovial capsules of the hip joint were found filled with reddish-coloured synovia, and the membrane injected and dark coloured, and in several cases in the acetabulum was found a well-marked dark purple spot, surrounding the attachment of the round ligament of the hip joint (ligamentum teres).

The bowels were found pale, and in some cases showing signs of previous inflammation on their peritoneal surface. The mesentery presented a pale saffron colour and increased thickness, due to a gummatous deposit.

The mesenteric lymphatics were uniformly enlarged, pale yellow, and friable.

The spleen was pale, small, shrivelled, tough, and hard.

The liver was soft and filled with dark blood.

The kidneys were found somewhat enlarged, very pale, and containing considerable watery fluid.

The genital organs fail to exhibit the extraordinary changes one would naturally expect to find. In a well-marked case in a mare, affected one year, where the vaginal discharge persisted to time of slaughter, the autopsy revealed the uterus and vagina containing a considerable amount of a dirty greyish-yellow purulent matter, the uterus enlarged to thrice its natural size, and its lining membrane and that of the vagina pale yellowish white, thickened and wrinkled. The left ovary contained a cyst, filled with one ounce of yellowish serum.

Stallions.—Autopsies on several stallions, all diseased from one and a half to over two years, exhibited the general changes as previously indicated, while in some cases the genitals showed marked changes, and in others there were very slight deviations only from the natural state. One very bad case, Black Brilliant (XIII), had scrotum enlarged to about ten times its natural size, hard and unyielding to the touch. The skin of the scrotum was enormously thickened and of a pale yellow colour. The inguinal gland of the right side was the seat of an extensive abscess, opening at the upper part of the scrotum. A large abscess, occupying the usual position of the testicle, filled with dark yellow, hard, cheesy pus, pushed the testicle from its place up into the inguinal ring. The testicle was small, atrophied, soft, flabby, and pale yellow, with the membranes firmly adherent at every part.

Penis offered no external evidence of disease.

Urethra contained a small amount of a dirty puriforum matter, the living membrance appearing roughish, greyish-yellow in colour, without any appearance of ulcers.

The seminal vesicles and enlarged portions of vasa deferentia contained a considerable amount of thin, greyish, puriform matter.

The left testicle was about natural in size, with coverings firmly adherent to every part. No appearance of ulcers was found in the urethra of either of several stallions examined, but all seemed to offer, in a greater or less degree, a collection of unnatural puriform material in the vesiculæ seminæ and vasa deferentia, from which, so far as could be seen, the infecting material had been derived.

The testicles were uniformly pale yellow, soft and flabby, and almost invariably smaller than natural.

In some cases the coverings of the testicle (tunica vaginalis propia and tunica albuginea) were thickened, adding to the gross size of the testicle and giving it a somewhat firmer feel than where this thickening was absent. The two peritoneal coverings were more or less completely adherent to each other. The condition of the sheath and scrotum varied widely from the normal size to the great enlargement in the cases noted above.

Other observers have noticed inconstant changes in the nervous system, principally of injection of the coverings of the brain and spinal cord, softening of the lower part of the cord, and occasional extravasation of fluid into the ventricles of the brain.

The nasal mucous membrane usually shows catarrhal inflammation, with collections of pus or mucus in the nasal cavities.

Metastic abscesses may occur in the testicles, spermatic cord, lungs, and other organs.

Diagnosis.—Of all contagious diseases, none probably are so insidious and difficult of positive diagnosis as Equine Syphilis in imperfectly developed, isolated cases, without a clear history, and since we now have the disease in our midst, a reliable means of diagnosis is certainly a desideratum.

To this end we should first decide whether or not there is a benign and a malignant form of this disease.

All English writers mention two forms, relying for their descriptions upon translations from the French and German.

Judging from these translations, it would appear that those authorities differ among themselves as to the existence of two forms of the disease, English writers, rather ineffectually, attempting to harmonise certain radical differences in symptoms by bringing to their aid climatic influences or different sources of origin.

Evidently, in some of these translations two distinct disorders are confounded, and Rodloff is undoubtedly correct in the main when he asserts that the so-called benignant form of Equine Syphilis is a wholly distinct benign affection.

In attempting to follow the writings in a foreign tongue, that very able and careful author Dr. Fleming is led into some remarkable contradictions and perplexities. In describing his benignant form, which he asserts corresponds to the first stages of the malignant, he makes particular mention of abundant pustular eruptions on the external genital organs, and later, in describing the malignant form, admits that in many of the most serious outbreaks these eruptions were absent, and yet these cases must pass through the primary stages like the benign.

We understand that a benign disease is one of a mild character not dangerous to life, while a malignant disease is one which jeopardises the life of the afflicted being.

Now, Fleming, discussing the nature of the disease, says, "And we must be content with the statement that it is an eminently virulent malady." Again, under the head of "Course and Termination," he says, "As a rule the progress of the disease is slow, and its termination most frequently fatal."

Again, still under the head of "Mortality and Loss," after quoting serious losses in several outbreaks, he says, "But it may be sufficient to state that the loss is variable, though always very serious, and is seldom less than fifty per cent., rising even to seventy," a remarkably severe loss for a disease frequently benign.

In no outbreaks is there a loss of less than forty to fifty per cent. mentioned, whereas if there be a benignant and a malignant form, the one passing into the other by imperceptible gradation, we should expect a like gradation of

losses, instead of nothing in the benign and fifty to seventy per cent. in the malignant.

Quoting a Bohemian writer, Fleming makes the incubative stage from eight to sixty days; while citing Haubner, writing of the benign form, he makes the time three to six days, thus apparently sanctioning the idea that a benign attack of a disease develops far more quickly after infection than a malignant one, although this benignant form is essentially the same as the first stage of the malignant.

Again, under the head of "Exanthema of the Genital Organs," Fleming describes a distinct exanthematous disease, without making any marked distinction between it and his benignant type of Maladie du Coït, and mentions, as synonyms, names taken from his "Synonyms of Maladie du Coït."

Professors Williams and Law follow briefly the description of Fleming, emphasising the pustular eruptions on the external genitals, as described by Fleming in his *exanthematous* affection and in his benign Maladie du Coït, and both are silent regarding the wholly distinct benign exanthematous disease, which is far more widespread and common than Maladie du Coït, is characterised by abundant pustular or vesicular eruptions upon the external genitals, which appear in successive crops, heal rapidly, and disappear spontaneously, or readily yield to simple local treatment in three to ten weeks, and rarely, if ever, ending fatally.

This disease has been fully described in my report of an outbreak at Kempton, Ill., which I investigated by your orders in October last, and which is undoubtedly the disease which most authors confound with the malignant disease under consideration.

While investigating the outbreak in De Witt County, I had occasion to see a young roadster stallion, property of B. F. Nickerson, of Heyworth, Ill., which was affected with abundant vesicular eruptions on the genitals, appearing in successive crops, healing rapidly, and leaving a temporary white cicatrix at the seat of the eruptions.

This horse being at the immediate border of the infected area, and relying upon the description of English writers, it was very naturally supposed that this horse had been exposed to and contracted the disease, but careful investigation showed that he had not been exposed, that all mares served by him remained sound, and in a few weeks' time the horse had completely recovered, and was unquestionably affected with the same benign venereal disease as that observed at Kempton.

There has been nothing about the present outbreak to suggest benignancy, as over fifty per cent. have already succumbed; a number were so worthless that they were bought at your orders, for a nominal price, and killed; and the few that remain have not passed through the malady without jeopardy to their lives, and in many cases their peril is not yet passed. Taking all facts into consideration, therefore, is seems quite reasonable to disagree with most writers and agree with Rodloff, that the so-called benign and malignant types of Maladie du Coït are really two wholly distinct affections, and admitting the existence of a malignant form only, which we choose to denominate Equine Syphilis, and a wholly distinct benign venereal disease, we are better prepared to arrive at a safe diagnosis.

The pathognomic signs in the mare consist, then, in the appearance, in eight to many days after coitus with an affected stallion, of well-marked uterine and vaginal irritation, with redness of the vaginal mucous membrane, and mucus becoming a muco-purulent discharge from the vagina, swelling of the lips of the vulva, enlargement, loss of pigment and unnatural dryness of the clitoris, and loss of pigment along the margin of the vulva and on the thin skin of the vulva, anus, perinæum, under side of tail, etc.

This depigmentation is peculiar and characteristic, presenting a marked distinction between the two venereal diseases.

In Equine Syphilis these white spots are *not* the result of pre-existent ulcers or erosions, but the depigmentation takes place without any other changes in the skin observable to the naked eye; while in the exanthematous disease the discoloured spots are the results of previous eruptions, and are no larger than the parent ulcer ($\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter), and regular, circular in outline, the pigment being most completely destroyed at the centre and being replaced by pigment first at the periphery; while in Equine Syphilis these white patches are indefinite in extent and contour. They may be one-quarter to one, or even four or five inches in diameter, or the different patches may extend and coalesce, until the whole perinæal regionis devoid of pigment, and when the pigment is replaced it is deposited hap-hazard over the entire discoloured skin. The discoloured spots in the benign exanthem are very transient, disappearing in ten to fifteen days, while those of Equine Syphilis persist for six to eighteen months and even longer, disappearing first or parts farthest from the vulva, then the margins of the vulva lips, and lastly the clitoris.

The open vulva and enlarged, protruding, unnaturally dry clitoris, especially in young and otherwise healthy mares, is quite pathognomonic. The welt-like, lenticular swellings in the skin of various parts of the body, the rapidly progressing emaciation without loss of appetite, the erratic and peculiar lameness and paralytic symptoms already described should, when present, suffice with the above to enable us to form a safe diagnosis.

In the stallion the history of the case, whether exposed or not, or whether infecting mares or not, is all important, otherwise the diagnosis is generally difficult and sometimes impossible. The constitutional symptoms, when present, are as characteristic in the stallion as in the mare, but the former may be long affected before developing these.

There is usually, however, some abnormality of the external genitals, either of the prepuce, sheath, testes, penis, or scrotum.

The prepuce, when affected in the earlier stages, presents a peculiar œdematous-looking swelling of variable degree, but it is unlike ordinary œdema, the infiltration being more fixed and elastic than in true œdema and not pitting distinctly on pressure; neither is it hard and indurated, but is yielding, painless, and elastic.

The penis when affected offers specially its pendent character; it hangs too far out of the sheath, generally in the prepuce, but in extreme cases hangs entirely out of the prepuce and sheath, full length and powerless, so that when the animal is trotted the penis is thrown from flank to flank by the swinging of the body.

When the testes are affected they may be atrophied and high up against the inguinal ring, or apparently enlarged and pendent, are usually soft to the touch, and indefinite in contour from adhesion of the coverings.

The prognosis is always unfavourable, and there is no safe guide by which we can predict the final result.

The mortality ranges usually between sixty and eighty per cent. of the affected animals. In the present outbreak, as shown by footings of the stallion list, almost seventy per cent. have died or been killed, at a nominal price, as practically worthless; and when we consider the imperfect recoveries in those remaining, the exceedingly protracted course of the disease, the expense of keeping while affected, and expense and trouble of treatment, the direct monetary loss to the owners has considerably exceeded the original value of the entire number of affected animals.

Contagium is "fixed," that is, transmissible only by direct inoculation, and

is thought by many authors to exist mainly or only in the secretions of the urethra in the horse, and the vagina and uterus in the mare.

Autopsies in several stallions in the present outbreak revealed no ulcerations or disease of urethra, but there was every reason to believe that the seminal vesicles and the enlarged portion of the vas deferens were the real sources of principal supply of the infecting virus in the stallion. Experiments by European veterinarians, as well as observations in the present outbreak, demonstrate fully that the disease is contagious, but it seems impossible to transmit the disease to others than solipeds (horse, ass, and mule).

The vitality of the virus is unknown; in affected animals it certainly persists for several years.

It is transmitted practically only by direct contact of a diseased with a healthy animal in the act of coition, although it is possible to transmit the disease by inoculation.

Cohabitation without sexual intercourse will not produce the disease.

Its extension is affected by diseased stallions and mares, the insidious character of the malady in both being specially favourable to the transmission of the disease to remote localities, where it may gain a serious hold and wide dissemination before its dangerous character is ascertained.

Treatment.—The chances of effecting a cure, or exerting by any known treatment any marked influence on the course of the disease, are very remote. Many different lines of treatment have been proposed, but their beneficial effects have not been well demonstrated.

Locally we should expect benefit in the earlier stages of catarrhal inflammation of the vagina and urethra, from emollient or mildly astringent injections, and later by the use of remedies of a more decided astringent nature—nitrate of silver, sulphate of zinc, sulphate of copper, etc. In three stallion cases of over one year's standing, showing well-marked urethral irritation and discharge, these symptoms were promptly eliminated by cauterisation of the urethra throughout its entire length with solid nitrate of silver. We would naturally expect benefit, in cases of long standing, from the use of alteratives, such as mercury, iodine, and arsenic; and where used in the present outbreak they have at times appeared to have a beneficial effect, or at least it could not be seen that mercury aggravated the disease, as some authors have stated. Castration is said to have a beneficial influence on the course of the disease in stallions, but it has not been tried during the present outbreak.

Prevention and Extirpation.—We are suddenly awakened to the existence of this, to us, hitherto unknown disease in our midst, and if not dealt with firmly and heroically, it must prove a serious scourge to the horse interests of Illinois and the country at large, and it is to be hoped that the sad experience of De Witt County may prove a timely warning.

The work of control and extirpation has surpassed our expectations in effectiveness in many particulars, due largely to an unusually hearty co-operation of almost every horse-breeder in the infected district, frequently at no small personal sacrifice; and to a continuance of this same earnest assistance we must largely look for an effective controlling and stamping out of the disease.

At the beginning of the investigations Messrs. Harrold and Culbertson and Foley and Seniff furnished a complete list of all mares bred to their stallions since affected, and other stallion owners followed their example freely, and by these lists every mare was traced as far as possible, and if found alive in the State was quarantined; and every diseased, suspected, or apparently at all dangerously exposed stallion was treated likewise. All exposed mares in the State were personally inspected by Dr. Casewell or myself, or their con-

dition otherwise reliably learned, and the notices of quarantine were served by Dr. Casewell, myself, or W. H. Wheeler, of Clinton.

Every stallion kept for public service in the entire infected area, so far as could be learned, and nearly every stallion within ten miles of that area, were personally inspected by myself, and the owners and keepers cautioned and advised to the best of my ability.

Since quarantining, three affected mares have died, and nine have been killed by agreement. All but two of the affected stallions (XV and XIV) have died or been killed, and the two remaining ones, owned by J. Fisher, are kept in Clinton, where their movements can readily be followed.

I firmly believe that we now have the disease fully under control in Illinois, and that all we now need is to permanently fix our grasp.

Fortunately, most of the affected mares are dead, and there now remain twenty-one affected in De Witt, one in Piatt, and one in Peoria County. Some of these mares are so badly affected as to be comparatively worthless, others are in moderate, while others are in good condition and apparently perfectly sound, and with this latter class rests the greatest danger of renewal of the losses of the past two years. The history of the disease in foreign countries repeats the warning over and over, Never under any consideration allow a mare affected with Equine Syphilis to be bred again.

The failure to heed this warning evidently explains the fact that wherever the disease broke out once it was very likely to reappear three or six years later, through the over-confidence of the owner of an apparently recovered and perfectly sound mare, by again breeding her to a stallion. Hence, at whatever labour or cost, all affected mares should either be killed or held rigidly in quarantine and confined to the townships where found and where stallion owners are acquainted with the disease.

Killing is certainly preferable, wherever it can be readily done, otherwise years of careful watching and supervision must ensue. As to the exposed mares which have not at any time shown any signs of the disease, I would recommend that they be released from quarantine two years after their last breeding to an affected stallion, after the following evidence is produced: first, the certificate of a perfectly reliable veterinary surgeon that he has made a careful personal inspection, and that he believes the mare perfectly free from Equine Syphilis; second, an affidavit by the owner, identifying the mare, giving a history of her breeding for 1885, 1886, and 1887, and affirming that to the best of his knowledge she has never shown any signs of Equine Syphilis.

Stallions.

I would recommend that the Smith and Ledden stallion X be released from quarantine in the spring of 1888, after satisfactory inspection, he having never, so far as can be learned, served any evidently diseased mare, has shown no signs of disease himself, and has transmitted the disease to no mares.

Numbers IX, XIV, and XV should be held firmly in quarantine until dead or castrated.

In further preventing the spread of the disease I would recommend that the accompanying list of exposed and diseased stallions and mares be printed in convenient form and widely distributed among stallion owners, along with such other matter pertaining to the disease as you may deem best. Among which I would suggest—

1st. A warning to all stallion owners that allowing any of the mares described in the list to be bred to any stallion, except the owner produce a certificate of release from quarantine from the Secretary of the State Board

of Live-stock Commissioners, would subject such stallion to indefinite quarantine.

2nd. A brief summary of the laws regarding quarantines and their violation.

3rd. A concise description of Equine Syphilis, and also of the benign exanthematous venereal disease of horses, Equine Chancroid.

4th. That no stallion owner should allow his stallion to serve mares whose history cannot be satisfactorily traccd.

5th. That no stallion be allowed to serve a mare that has any discharge from the vagina or swellings of the vulva, nor mares that show unusually persistent œstrum (heat), nor mares that are extremely old, debilitated, or unthrifty in appearance, nor that present any discharge from the nostrils or show unhealthy sores on any part of the body, or mares partially paralysed or unaccountably lame in the hinder parts, especially when accompanied by bad general health.

6th. That all stallion owners should take the precaution to have the penis of the stallion thoroughly washed immediately after serving each mare.

7th. That no owners of mares should permit them to be served by any stallion presenting any enlargement or swelling of testicles, scrotum, penis, sheath, or prepuce, or any undue pendency of penis or testicles, or any unnatural discharge from the penis, or any abrasions, ulcers, or sores of any kind on the penis, prepuce, or sheath, or having any discharge from the nostrils, or any unhealthy sores on any part of the body; or any stallion showing an unaccountable lameness, stiffness, or weakness of loins, except the owner of such stallion produce a certificate from a qualified practitioner of undoubted standing, certifying that such stallion is free from any contagious or infectious disease.

The tabulated list of exposed mares being too long for insertion, the following summary is inserted instead:—

Mares dead of disease previous to date of investigation		47
Died since quarantined (of Equine Syphilis)		3
Killed by orders of Live-stock Commissioners		9
Affected, not found		4
,, in quarantine	23	
Apparently well, in quarantine	193	
Total remaining in quarantine	216	216
Died or killed since quarantine	12	
,, from accident since quarantine	2	2
Total originally quarantined	230	
Animals supposed to be well, not found		116
Total mares exposed		397

Of the four diseased mares marked "Not found," one has later been found and killed at Appleton, Wis., two are the Sandusky Wilson mares (see foregoing report under "Origin of Disease in De Witt Co."); the fourth was sold to unknown shipper, previous to investigations.

The apparently well mares not found were mostly included in a lot of 100 Texas mares, sold in St. Louis, supposedly for the Boston market, for street car work. The others were sold to various shippers, for draught purposes.

The list of stallions, being of less length, is inserted in tabulated form.

List of Exposed Stallions, with Number of Mares Served after Earliest Supposed Exposure.

Arabic numerals refer to mares, Roman numerals to males, throughout Report. The tabulated list of mares is too extensive for insertion here.

Number.	Owners.	P. O. Address.	Breed.	Description.	Condition at Date of Quarantine.	When Exposed.	To What Mare.	When Quarantined.	No. of Mares Served.	No. of Mares Affected.	Percentage of Mares Affected.	No. of Mares Dead.	Percentage of Mares Dead.
I and II	Harrold & Culbertson	Wapella, Ill.	French Draught	Grey	Affected	1884-6	377, 378*	July 25, 1887	177	36	20⅔	29	80⅝
III-VI	Harrold & Culbertson	,,	,,	Black	,,	1886	,,	,, 21, ,,					
VII	Harrold & Culbertson	,,	Grade	Grey	,,	,,	,,	,, ,, ,,					
VIII	W. R. Carle	,,	French Draught	,,	,,	,,	Unknown	,, 22, ,,	9	2	22	2	100
IX	Geo. Halsey	,,	Grade French Draught	Black	Apparently well	1887	145†	,, 15, ,,	1	0	0	0	0
X	Smith & Ledden	,,	French Draught	Grey	Apparently well	,,	5, 131, 142‡ 356, etc.	Aug. 5, ,,	(47)	0	0	0	0
XI	Temporary quarantine only.		Affected, but not with Equine Syphilis.										
XII	Foley & Seniff	Wapella, Ill.	French Draught	Grey	Affected	1884-6	377, 378*	July 27, ,,	106	44	41½	28	61
XIII	,,	,,	,,	Black	,,	,,	,,	,, ,, ,,					
III	,,	,,	,,	,,	,,	,,	,,	,, ,, ,,					
XIV	Jos. Fischer	Clinton, Ill.	,,	,,	,,	1887	Unknown	,, 19, ,,		1		0	0
XV	,,	,,	,,	Brown	Apparently well	Before importation.	Affected when imported.	,, ,, ,,	48	2	6¼	?	?
XVI	,,	,,	,,	,,	Apparently well	1887	Mares from XIV & XV.	,, ,, ,,					
XVII	Simpson, Franklin, & Co.	,,	,,	Grey	Affected	1886	186, 187§	Aug. 18, ,,	33	1	3	0	0
XVIII	Lisenby & McNamara	Fresno, Cal.	Grade French Draught	,,	,,	,,	164‖	Not Quarantined.	123	0	0	0	0
							Total Mares.....		397	86	21⅔	59	63⅔

Mule.	Owner.	P. O. Address.	Description.	Condition at Date of Quarantine.	When Exposed.	To What Mare.	Exposed.	Affected.	Dead or Killed since Quarantine.
XIX.	Harrold & Culbertson.	Wapella, Ill.	Black Gelding.	Affected.	1886.	Harrold & Culbertson's.	1	1	1
						Total Stallions	17	14	12
						Total Animals.....	415	101	72

Remarks.—I. Died Sept. 16th, 1887. II, III-VI, VII. Killed Oct. 19th, 1887. VIII. Died July 28th, 1887. IX. Castrated 1888. X. Released from Quarantine March, 1888. XII and XIII. Killed Sept. 20th, 1887. XIV, XV. In Quarantine. XVI. Died 1887, from the effects of castration. XVII. Killed Nov. 30th, 1887. XVIII. Last heard from at Fresno, California; still affected, and under no restrictions.

* See foregoing Report, under "Origin in De Witt Co." † Became affected 1886, by being bred to I-VI. ‡ Exposed 1886, but not diseased. § Exposed and diseased, autumn, 1885, by XII and XIII. ‖ Bred to and diseased by XII and XIV early in 1886, and bred late in 1886 to XVIII. XVIII probably served no mares after 164.

PREVENTIVE INOCULATION.*

BY M. ROUX.

In the year 1881, M. Pasteur laid before the members of the International Congress assembled in London an account of recent researches carried on in his laboratory, on the subject of preventive inoculations for Chicken Cholera and Splenic Fever. Since that time nearly eight years have elapsed, and we may ask ourselves what has become of the work then begun: has it fulfilled its promise, and what place have the new principles which it involved taken in the science of to-day? It was on these questions that M. Pasteur intended to have spoken to you this afternoon, but the state of his health did not permit of his availing himself of the honour done him by the President and Council of the Royal Society in asking him to give the Croonian lecture this year. He therefore proposed that I should speak in his name, though personally I cannot hope to speak as he would have done of the preventive inoculations which he himself thought out and initiated. My sole title for addressing you is that of my being M. Pasteur's collaborator, having had, in fact, with Messrs. Chamberland and Thuillier, the honour of being associated with him from the commencement of his researches upon the prevention of contagious diseases, and, further, that I have been an eye-witness of everything which I shall lay before you.

Most infectious diseases never recur, and thus Small-pox, Measles, and Typhoid Fever rarely occur more than once in a lifetime. Further, a first attack of an infectious disease, even though a slight one, renders us safe from these diseases for a certain time; and it is this fact, coupled with the non-recurrence of infectious maladies, which has led to the discovery of preventive inoculation.

Instead of waiting till we are struck down unawares by a sudden attack of the malady, frequently during an epidemic of high fatality, and under conditions very unfavourable to our power of resisting it, we now seek to meet it at some favourable moment, and guarded by all those precautions which we know are capable of greatly diminishing the danger. In the place of natural, that is ordinary, infection, unforeseen and over which we have no control, we have now substituted a mode of artificial infection, prepared in such a way as to ensure exemption with as little risk as possible.

It was against Small-pox that, for the first time, preventive inoculations were had recourse to. An involuntary experiment, and one, unhappily, too often repeated, had shown that the liquid of the Small-pox pustule is virulent, that is to say, that this Small-pox lymph, introduced into the body through a wound in the skin, has the power of communicating the disease to a person who has not previously suffered from it. Inoculation with Small-pox was, therefore, easy; all that was required for its production being a prick from a lancet charged with Small-pox pus. It was, therefore, the custom to endeavour to find cases of mild Small-pox, from the pustules of which a virus was taken supposed to be non-malignant, but yet capable of subsequently rendering exempt against the virulent disease those who were inoculated by such a mild virus. It is well known to you how widely such inoculations spread, though far from being of an innocent character, for the inoculation which was supposed to give the disease in a mild form often produced it very severely, and sometimes even the inoculation was the cause of death.

How great, therefore, was the progress made by Jenner in replacing inoculation by vaccination, that is to say, in substituting for a severe illness one which is invariably insignificant, and yet is an efficient protection against infection by Small-pox!

* A lecture delivered before the Royal Society, on behalf of M. Pasteur. From the *British Medical Journal.*

Although from the beginning of this century we have enjoyed the inestimable benefit of Jenner's vaccination, we still have not yet completely fathomed its meaning. What is the relation between vaccination and Small-pox? Why does the vaccine disease of the horse and the cow, inoculated into man, render him exempt from Small-pox? Is the virus of vaccine merely that of Small-pox modified, or are vaccine and Small-pox two different maladies?

It would have seemed that these questions were easy to resolve, as both Small-pox and vaccine admit of experimentation upon them; yet, though always under discussion since Jenner's time, they yet remain without any definite solution having been arrived at. Jenner's great discovery, which seemed to open so wide and hopeful a horizon, has remained hitherto a solitary fact in medicine. Born of a happy observation, marvellously developed by a genius as patient as it was penetrating, it was at the time of its birth so far in advance of the medical science of the time that even now, after all the progress which has been made during the last seventy or eighty years, we can but suspect its real interpretation. Jenner thus demonstrated to us, by one remarkable example, that it is possible to protect ourselves from a mortal malady by inoculation with a trivial one; but he gave us no general method leading to the prevention of other infectious diseases.

The discovery of the power of artificially attenuating—that is, weakening—a virus does, on the contrary, furnish us with a veritable method of protective inoculation, and it is one which has given us an uninterrupted series of good results, though this invention dates from but a very few years back. Like all other recent progresses in our knowledge of virulent diseases, it found its origin in M. Pasteur's researches on ferments. In revealing to us the nature of ferments, he taught us that of the poison of infectious diseases. Like the yeast of alcoholic and the yeast of lactic fermentation, viruses are living beings—microbes, as they are now called—and, just as the development of yeast in a sugary liquid produces alcoholic fermentation, so that of microbes in the tissues of the body produces the phenomena of infectious disease. The process which has enabled us to obtain the culture of microbic ferments in a state of purity is the same which has enabled us to obtain pure cultures of microbic virus outside of the body.

The indispensable condition of success in these cultivations is that of absolute purity—that is to say, the avoidance of the introduction of other foreign germs which everywhere surround us. For this purpose we have now arranged a definite *technique*, strict, but at the same time very simple. As the elements of the virus are living beings which can be kept in artificial cultivations, and as they are only distinguished from other lowly organised beings and plants by their property of invading the bodies of men and animals, the question naturally presents itself, Would it not be possible to modify them by cultivation in the same way that other plants are modified? Could they not, for example, be thus robbed of those qualities which make them formidable? To modify a virus by special modes of cultivations—such was the idea of M. Pasteur; a fruitful idea, from which have sprung those discoveries which I now propose to lay before you.

It was in studying a malady called "Chicken Cholera" that M. Pasteur for the first time obtained by this means an attenuated virus. This disease is so fatal to fowls, pigeons, and birds in general that it has been given the name of Cholera. It is caused by the development in the bodies of those attacked of a very small microbe, shaped like a small rod with rounded ends, and almost as wide as long. The photograph projected on the screen shows us the image of a drop of blood taken from a fowl which succumbed to the natural disease. You see between the globules of the blood the little rods which are the cause of the disease. It is, however, not the blood alone in

which the microbe is found; all the tissues are invaded by it. The intestines contain a great quantity, so much so that the dejecta of the sick fowls are able to spread the malady, and it is in pecking upon the contaminated ground that healthy birds are infected.

If a minute drop of blood from a fowl which has just died of the malady be introduced under the skin of a healthy fowl, the animal inoculated soon falls ill, ceases to eat, its feathers are erected, its wings hang down, and it seems oppressed with unconquerable somnolence. It soon dies, sometimes in less than twelve hours. The blood of the bird which has thus died from experimental inoculation is found to be swarming with the microbe, exactly like that of the fowls which die after natural infection. It seems, then, that Chicken Cholera is a contagious disease capable of inoculation, and in which the virus is principally contained in the blood of the animals attacked by it. The culture of the microbe which is so easily accomplished in the blood of the animals can also be carried on artificially.

If with proper precautions we inoculate chicken broth slightly "alkalised," and perfectly limpid, with a drop of the blood, and if we then place the bottle in a stove at 35° C., we shall find after some hours that the broth is turbid, and that this is due to the development of the little Chicken Cholera microbe. Under the microscope we shall see that each smallest drop of this *bouillon* contains an innumerable swarm of motionless microbes, like those contained in the blood which served as "seed." An infinitesimally small quantity of this first culture placed in a new bottle will give a second culture, and by successive cultivations as many successive generations of our microbe as we wish for can be obtained. Each drop of these cultures, even up to the twentieth, would kill, with all the signs of Cholera, quite as surely as the first, any fowl which was inoculated by it. This experiment affords a decisive proof that the virus of the malady is without doubt the microbe found in our cultures, and as we now know how to prepare under absolutely certain conditions as large quantities of the virus as we wish for, we have all the means at hand for the study of this disease.

If we expose at a temperature of 33° C. to the contact of the pure air which penetrates through the cotton wool stopper of the culture flask one of these cultivations, which is so active that a drop of it would kill any fowl into whom it was inoculated, and if each week we extract a small quantity of the contents of the flask and try its virulence upon healthy fowls, we observe the following changes: During the first week of the experiment all the fowls inoculated die, but after a longer time a change sets in in the degree of virulence. Not all the fowls now die when a certain quantity of this longer preserved culture is injected under their skin. Some recover after having been very ill. As time passes the strength of the virus is still more diminished, and the number of fowls which recover increases. At last, in continuing the experiment, the moment comes, say, for example, after it has remained for two months in the incubator, when this virus, at first so deadly, not only will not kill a single fowl, but causes them apparently no inconvenience whatever; and yet the virus is not dead, for it still grows in fresh nutritive substance in which it may be sown. But in this new culture none of the former virulence returns. The daughter cultures have exactly the same effect upon the fowls as the mother culture had at the time when it furnished the fresh seed. The new property of the virus, therefore, that of harmlessness for those animals for which it was formerly so fatal, can be perpetuated for successive generations. By making such cultivations we shall obtain at their respective dates a whole series of kinds of virus of diminishing activity capable of giving to the animals either a fatal malady, a dangerous malady, a serious malady, or one wholly inoffensive.

To what cause is this gradual diminution of the malady due? To the con-

tinued action of the oxygen of the air. If, instead of making the cultivation in a bottle where the renewal of the air is possible, we were to make it in a closed tube only containing a small quantity of air, the microbe would soon consume all the oxygen, and would cease to grow, for oxygen is a necessity of its development. In a tube deprived of air it cannot grow; it remains alive in it for a very long time, as one can satisfy oneself by sowing in aërated *bouillon* the small culture formed in these sealed tubes. After being preserved for a year in this sealed tube it still gives cultures which are as active as a recent culture from the blood of a fowl just dead of Chicken Cholera.

We see, therefore, that the diminution in virulence which takes place in those cultures exposed to the air is dependent on that exposure, and not on the length of time the microbe is kept.

Gentlemen, what results were won, what new ideas gained by this single experiment on the culture of the microbe of Chicken Cholera? By it M. Pasteur showed us that the viruses of infectious diseases are no more the unchangeable entities they were before imagined to be. He taught us that, like all other living beings, the microbic virus is susceptible of modifications which heredity perpetuates, that it is above all the virulent character which becomes modified, and finally that this modification can be produced artificially, and regulated according to the wishes of the experimenter. By this experiment M. Pasteur established the attenuating influence which the air possesses; at the same time he explained how it is that the activity of a virus, under natural conditions as seen in epidemics, is preserved or exhausted, and how the same malady may be sometimes malignant, sometimes light.

We have seen how fowls inoculated with attenuated Cholera virus, suitably chosen, took the light form of the malady and soon recovered. If, now, you inoculate these recovered fowls with blood from a fowl dead of the virulent disease, and at the same time you inoculate a number of fresh fowls, you will find that all the fresh fowls will die, while those previously inoculated with attenuated virus will resist the disease. They will merely have a passing illness, which soon disappears. The inoculation with the attenuated virus has rendered them exempt from the fatal form of the disease; it has given them immunity; and if, in the same animals, you make successive inoculations of increasing intensity, you will make them refractory to Cholera to such an extent that you may inoculate them with the most virulent blood, under conditions where they would be exposed to the most intense natural contagion, and they will not experience the least inconvenience from it, and it will be impossible to kill them by this illness, which was formerly so formidable.

The attenuated virus therefore discovered by M. Pasteur is quite as efficacious against Chicken Cholera as Jenner's vaccination against Small-pox. But while we are ignorant of the relations between Small-pox and vaccine, none of the relations between the vaccine virus of Fowl Cholera and the virulent virus are hidden from us.

This plan, moreover, is not only successful in the case of Chicken Cholera, but constitutes a definite method of attenuation of virus, the value of which has been proved by the production through its means of the vaccine of another malady more interesting than Fowl Cholera, as it is both a scourge for cattle and can also be transmitted to man. I mean Splenic Fever, Anthrax, or Charbon, for it is by the regulated action of heat and air upon the Anthrax virus that the vaccine of this malady has been obtained; but in the case of Anthrax a difficulty arose which was not present in that of Chicken Cholera.

The Anthrax virus is found in the blood of animals which have just died of the disease. Cultivated in veal broth slightly alkaline, it forms a culture resembling cotton down swimming in a clear liquid. This down is formed by

long and interwoven filaments, as you see them in the photograph. In the interior of these filaments, after some hours, you see bright spots beginning to appear, the outline of which become more and more distinct. These brilliant spots are the germs or spores of the bacillus discovered by M. Koch; these spores are the veritable seeds of the microbes, and as grains of corn, for example, offer more resistance to heat and dryness than does the growing corn, so the spores can bear without perishing a temperature of 90° C., and the action of a number of agents which would kill the bacteride in its filament stage. The spore is thus the resistant condition of the microbe of Anthrax, and wherever it finds conditions favourable to germinating, either in the body of an animal or in some artificial nutritive culture, it will give forth filaments, and these in their turn will produce new germs.

If we expose the Anthrax bacillus to a temperature of 38° C. and the contact of the air, as we did the microbe of Fowl Cholera, its virulence will not diminish. Even at the end of a long period it would still kill all the men and animals into whom it was inoculated. It consequently appears that the oxygen of the air is in this case unable to exert its attenuating influence, because the spores which are formed during the first hours of the culture are able to resist its action. In order, therefore, to repeat the conditions analogous to those which were successful in the Chicken Cholera, we must first prevent the bacilli from producing spores. The way to do this is by cultivating Anthrax not now at a temperature of 35°, but of 42° to 43° C. Under these conditions the bacilli develop, producing the filaments, but no spores. If we try every three days, for example, the intensity of the virulence of a culture thus made at a high temperature, and in which no spores are formed, by inoculating it into sheep and rabbits, we shall find that in the first days of the experiment all the inoculated animals succumb; then that the virus becomes less active, and the sheep resist, while the rabbits still die, though after illnesses more and more prolonged. After a still longer period the culture made at 42° loses its danger for the rabbit, but is still fatal to guinea-pigs and to mice. Finally the moment arrives when it is quite harmless even to these little rodents, very sensitive to the Anthrax virus as they are. We here see, as with Fowl Cholera, the virus passing through all the stages of decreasing virulence and finally becoming harmless. The bacilli, which at a high temperature give off no germs, yet form them rapidly if cultivated at 30° or 35° C., and the spores which are then produced preserve the same degree of virulence as the filaments from which they were derived. It is, therefore, only necessary to draw off each day a little of the culture from the bottle at 42°, and to place it in *bouillon* at 85° C., in order to have a series of cultures of graduated virulence and furnished with spores capable of fixing each of these special degrees of intensity. The sheep and oxen which receive these attenuated bacterides exhibit a passing fever, but if, later on, you inoculate them with virulent virus, it has no effect upon them. One has, therefore, only to choose among the degrees in this scale of virulence that which will give to the animal one is desirous of protecting from Anthrax an illness slight but sufficient to ensure the desired exemption. In practice the vaccinations of oxen and sheep are done twice. The virus of the first inoculation is very attenuated, and is intended to prepare the animal for the action of the second and more energetic inoculation, which is prepared twelve days after the first. The whole difficulty in Anthrax inoculation consists in the choice of these two viruses, and in keeping the relation between their degrees of virulence invariable. Everyone still has in his remembrance the striking demonstration of the efficacy of these preventive inoculations given at Pouilly-le-Fort in 1881. Five-and-twenty sheep, chosen promiscuously from among fifty, were inoculated with attenuated virus of Anthrax, and afterwards with the virulent virus at the same time that twenty-

five other fresh ones were inoculated as a control experiment. The twenty-five vaccinated sheep remained healthy; the twenty-five control sheep died of Anthrax. Demonstrative as this experiment was, it did not obviate violent attacks, the first of which was against the principle of the method.

The possibility of obtaining attenuation of the Anthrax virus under the conditions laid down by M. Pasteur was denied. It is, however, unnecessary to dwell upon this point, as it is admitted even by those who contested it, for example, Koch and others; and the attenuation of the bacilli cultivated at 42° C. has become a classical fact. The answer to lay criticism is to be found in these tables, which give the number of animals inoculated in France since 1881.

TABLE I.—*Animals Vaccinated against Anthrax.*

Years.	Sheep.	Oxen.	Mortality among Sheep.
1882	243,199	22,916	1.08 per cent.
1883	193,119	20,501	0.77 ,,
1884	231,693	22,616	0 97 ,,
1885	280,107	21,073	0.90 ,,
1886	202,064	22,113	0.75 ,,
1887	293,572	42,538	
1888	269,599	34,464	

The mortality among sheep before the preventive vaccination for Anthrax was 10 per cent.; since that period it has fallen to less than 1 per cent.

It shows how firmly established these inoculations are in agricultural practice, while the rise in their number is the most convincing proof of their efficacy. The farmer, of course, cares nothing for scientific discussions. For him, preventive vaccination is judged entirely from the standard of profit and loss; and in eight years he has had ample opportunity of coming to a definite conclusion on this point. The mortality among sheep in the Anthrax districts has gone down from 10 per cent. to 1 per cent. Insurance companies insert a clause in their agreements making preventive inoculations of the insured cattle obligatory; and in Austria, Italy, and Spain the vaccinations are beginning to be widely adopted. What better arguments could be adduced to prove the great service which the discovery has rendered to agriculture? But I do not desire to dwell on this point, and will proceed, having already discussed the attenuation of the virus, to consider the fact of its return once more to the virulent condition.

If in Nature we were to come across one of these attenuated bacteria which we have learnt to prepare, and which are so harmless as to be incapable even of killing a mouse, it would clearly be impossible for us to recognise in this inoffensive microscopical object a descendant of the terrible bacillus anthracis. To do so it would be necessary to have watched it in its stages of gradual attenuation. It is, however, possible (always supposing that the process of attenuation has not been carried too far) to make the bacillus reascend the steps of virulence down which it has come, and so to render it once more virulent.

We have stated that it was not capable even of killing adult mice; but let us inoculate with it a very young mouse, only one day old. This young mouse will be much more sensitive to the action of the virus than the grown up one would be, and it will die in a few days. In developing itself in this young mouse, the bacillus will have recovered a portion of its old fitness for life in

living surroundings; and the blood of this first mouse introduced into that of one a little older will cause its death, and thus proceeding step by step from the youngest mouse to the oldest, it will gain power to kill first old mice, then guinea-pigs, rabbits, sheep, and, last of all, oxen, which are among herbivorous animals the most callous to the action of Anthrax.

Thus we see that we can increase the virulence as easily as we can diminish it; and that it manifests itself by the increasing power of the microbes to germinate in the bodies of living animals, a power which can thus be either acquired or lost under respectively appropriate conditions. That this increase of virulence which we have thus excited is going on in Nature we can well imagine; and that a microbe, at first harmless for a particular kind of animal, should afterwards become dangerous to it. Given that some fortuitous circumstance should have introduced it into an animal with but feeble power of resistance, and it will grow there. This first cultivation will adapt it to parasitic life; it will pass out ready to develop in an organism in which it could not previously have gained a foothold, and after several such passages it will become really formidable.

There is no rashness in believing that by such means in the course of ages new forms of virulence have been evolved, and that these experiments on the variation of virulence throw a flood of light on that most obscure of questions, the origin of new virulent diseases. For these results also explain how one and the same kind of microbe can produce such diverse morbid effects; how, in its active or virulent state, it causes a general disease, rapidly ending in death, and in its passive or attenuated condition produces nothing more than a special local lesion.

Other viruses have also been attenuated by this method of the action of the air upon the cultures. At the Congress held in Geneva in 1882, M. Pasteur cited a whole series of fresh examples. I shall, however, only speak to you of the attenuated virus of a special form of Swine Fever, a disease much dreaded by farmers, and known in France by the name of "*rouget*,"* as the sick animals are distinguished before death by red patches on the skin.

The microbe of *rouget* is a bacillus which is found in the spleen and the lymphatic glands of the swine which die of the disease. In cultivation it produces no spores, and is therefore specially amenable to the influence of the air, and, in fact, if left long enough exposed to its action, its virulence is totally destroyed. But there is a further method of attenuation discovered by MM. Pasteur and Thuillier, and which is of great interest, as it shows the changes which a virus may undergo in its passage through animals of different kinds. *Rouget* injected into a rabbit kills it within a few days. A small quantity of the "pulp" from the spleen of this rabbit inoculated into a second one will cause death still more quickly, and the disease can thus be passed through a whole series of rabbits. But the extraordinary point (discovered by MM. Pasteur and Thuillier) in these inoculations is that, as the strength of the virus increases for the rabbit it is diminished for the pig; so much so that, after a sufficient number of passages of the virus have been made through the rabbit, it has become a vaccine for swine, able to confer upon them exemption from the fatal form of malady.

With this example before us, the question arose, What would happen with certain human diseases if we made them also pass through a great number of different kinds of animals? Is not this very process taking place in Nature, and does it not give fresh support to the idea that the vaccine of Small-pox becomes modified by its passage through the horse and the cow?

After all this work upon the prevention of Fowl Cholera, Anthrax, and Swine Fever had been accomplished, M. Pasteur devoted himself to the study

* This form is known in Ireland as "red soldier," and is not the same disease as the pneumono-enteritis called "Swine Fever" in this country.—Tr.

of Rabies. When, in 1880, the study of this disease was begun in M. Pasteur's laboratory, the following facts concerning it were alone known: that it was an infectious disease, that the virus was contained in the saliva of rabid animals, and that it was transmitted through their bites. We knew also that the period of its incubation varied from some days to some months, and here our definite knowledge of its pathology ended. Many experiments, however, had been made on the subject, but two causes had rendered them especially difficult to carry out and their success uncertain.

Inoculation of the saliva of a rabid into a healthy animal does not always produce Rabies, but often has no effect whatever. Among animals susceptible to the malady, some only become rabid after such a lapse of time that the prolonged waiting, combined with the uncertainty of the results, puts the patience of the experimenter to a most severe test. The saliva of a rabid animal affords an untrustworthy virus, because it contains a quantity of different microbes, which, when introduced under the skin contemporaneously with the virus of Rabies, may prevent the development of this latter, and set up inflammatory processes originated by their growth. The first thing to do, therefore, was to find some source of the virus of Rabies which should be uncontaminated by other microbes. All the symptoms of Rabies arise from the disturbance of the nervous system; hence the idea that in that system the rabic virus was specially to be found presented itself to the mind. The previous attempts made, however, to show that the nervous system of a rabid dog was virulent were unsuccessful, because the manipulations to which the nervous matter was exposed in order to inoculate it introduced into it those other microbes which it was essential to exclude.

By inoculating with absolute purity from the spinal cord the brain or the nerves of an animal which had died of Rabies, M. Pasteur demonstrated that the true seat of the virus was to be found in the nervous system. A portion of the nerve centres of a rabid dog, injected subcutaneously into a healthy one, will produce Rabies more surely than the most active saliva. This demonstration enabled us to take a decided step forward in its study. The rabic virus being contained in the nervous centres, and the symptoms depending entirely upon that system, the idea naturally followed that the disease only shows itself when the nervous centres are attacked by the virus. Further, that the incubation period is governed by the time taken by the virus to travel from the point inoculated up to the cerebro-spinal axis and for its development therein. If, therefore, the virus be inserted directly into the nervous system, where it has to develop, the incubation ought to be shortened and the disease follow with certainty, because the virus can no longer be destroyed or diverted from its course during its long journey.

Gentlemen, experiment has fully confirmed this theory, as may be seen from the record of the first dog inoculated by trephining, in which the incubation period was reduced to fourteen days. In fact, any dog inoculated under the dura mater with a little of the spinal cord or brain of a rabid dog takes Rabies with absolute certainty and within a period rarely extending beyond eighteen days. Thus we are delivered from the uncertainties belonging to subcutaneous inoculations and from the weariness of a long incubation period. After this experiment the study of the disease went rapidly forward; it was proved that the virus existed in the nerves and that by that route it travels from the original wound to the brain and spinal cord, and also that it can in some cases be conveyed by the circulatory system. It will be seen, therefore, that the manifestations of Rabies may be varied, as the manifestations of the disease in the beginning will depend upon the particular region first encountered by the virus, and finally why it is that there are forms of the disease which until now were unrecognised, and which differ from the classic type. The operation of trephining is in itself harmless when performed with

proper antiseptic precautions. It is as successful with the rabbit as with the dog. If inoculation by trephining is performed upon a series of rabbits, from the spinal cord or medulla oblongata of an animal which has just died, and this process is continued with successive animals, we find that the duration of the incubation period, which was at first from fourteen to eighteen days, gradually diminishes. It becomes shorter and shorter as the number of passages of the virus increases, until, at the end of a hundred of the successive inoculations, it has gone down first to seven days, and finally to six. At that point it remains stationary, the rabic virus seeming then to have attained its maximum virulence for that animal (the rabbit), and the virus is said to be "fixed." It is from this "fixed" virus that M. Pasteur obtains his vaccine for Rabies by a process similar in several details to that already used for attenuation in Chicken Cholera, Swine Fever, and Anthrax.

If in a bottle with an upper and lower tubulure, containing below fragments of caustic potash and closed by a piece of cotton-wool, there is placed a spinal cord of rabbit which has served in a passage series of inoculations, this cord, which contains a quantity of "fixed" virus, gradually dries, preserved from dust and exposed to the contact of the air, at a temperature of 25° C., care being taken to keep it at this point. If each day we take a small quantity of this cord and inoculate on the surface of the brain of a rabbit, we shall perceive that as the cord becomes dry in the sterilised warm air so it loses its virulence. At the end of five days' drying, it will only be capable of killing some few of the rabbits who have received it. At the end of fourteen days we find it absolutely innocuous, after having passed down the scale of gradually diminishing activity during the preceding days.

Having now obtained our material containing the attenuated virus, if we each day inject subcutaneously into a dog a portion of the attenuated cord, crushed in water, taking care to begin the injection with the harmless fourteen days' cord, to go on on the second day with the thirteen days' cord, then the third day with the twelve days' cord, and so on till we reach the cord at zero, or, in other words, spinal cord unattenuated, spinal cord which is deadly, this dog thus inoculated will not die, nay more, we may try him with the most active rabic virus inoculated into the brain and he will remain perfectly well, though we know that otherwise intracranial inoculation produces Rabies without fail. There is, therefore, positive proof that the injections of the dried cord have produced exemption from the disease. The experiment may be repeated as often as you please, but the results remain the same. Dogs which have subcutaneously received the series of cords commencing from the fourteenth day cannot take the disease either from the bites of mad dogs or in any other way. The exempt condition has been obtained in one fortnight.

Usually Rabies remains latent in a dog which has been bitten for a period generally exceeding one month. It might therefore be possible to profit by this long incubation period to give before its manifestation exemption from the malady. To elucidate this point, out of a number of dogs bitten by rabid dogs, or inoculated under the skin with rabic virus, some were preserved for control experiments, while the others were subjected to the preventive inoculation of the dried cord in augmenting degrees of virulence. Of these latter not one took Rabies, while of the former a great number died with the characteristic symptoms of the malady. It was proved possible to prevent Hydrophobia even after the bite.

Notwithstanding, however, the favourable results obtained upon animals, the application of the same method to man was undoubtedly a bold step. By what urgent solicitations and "medical advice" M. Pasteur agreed to take it is a matter of history. In July, 1885, the boy Meister, terribly bitten by a rabid dog, was the first to undergo the anti-hydrophobic inoculation.

It is a noteworthy date, and marks an epoch, not only in the history of the laboratory of M. Pasteur, but in that of Science herself. I shall not dwell upon that which is well known; how, after this first successful attempt, persons bitten came to the laboratory from all parts, nor how, since then, each month about 150 persons come to obtain the anti-rabic inoculations. Some among you have been present at these inoculations, and have seen how the emulsions of dried—that is, attenuated—cord are prepared to avoid the introduction of any alien germs. The injections are made in the side, on the right and left alternately, and are repeated during fifteen days. For ordinary bites the inoculations start with the fourteen days' dried cord, and end with that of three days. For more dangerous wounds, those of the head and face, the number of inoculations is greater, and we proceed to the more recent cords more quickly, as it was soon discovered that these last-mentioned kinds of wounds required a more active treatment.

Since the commencement of the inoculations until now (March 21st, 1889), 6,870 persons have been treated in the Paris institute alone; and among them many were very severely wounded. The proof of the rabidity of the animal which gave the bite has been furnished either by experiment or by veterinary examination in 80 per cent. of the cases. The mortality among the persons bitten by indubitably rabid dogs and thus treated is about 1 per cent., a very low rate if compared with that of 15 per cent. which usually follows the bites of mad dogs. It is scarcely credible that this extremely small number of failures should have given rise to such violent attacks against this practice; the most contradictory accusations have been brought against it. It was declared to be inefficacious, that its good results were obtained by the treatment having been applied almost entirely to persons bitten by healthy dogs, that the statistics showed that as many persons had died in France of Rabies since the introduction of M. Pasteur's system as before it. This last assertion was made by badly-informed persons, who took for complete statistics documents allowed to be insufficient even by the very individuals who published them. The proof of the efficacy of the system is to be found by examination of those cases where the rabidity of the attacking animal was incontestably, because experimentally, proved; and above all, from such of these cases as were bitten on the head and face. In this latter class alone, it is well known that the ordinary mortality is 80 per cent., whereas among those treated at the Pasteur Institute the mortality does not reach 4 per cent.

Other adversaries asserted that the treatment was dangerous, and increased the probability of death, and thus found themselves confronted with the singular paradox of a dangerous treatment enormously diminishing the death-rate of the disease, and with their previous assertion that the inoculations produced no result whatever. These last opponents were furnished in support of their contentions with the violence of their assertions alone, as they had made no experiments whatever.

Others followed, however, who contended that they had proved by experiment that the foundations themselves of the system were unsound, and that the anti-rabic inoculations could not give immunity to dogs. The fate of these pretended experiments is well known to you. They were shown, on unquestionable authority—that of the English Commission charged with the inquiry into the inoculations—to be inexact. You know, gentlemen, of whom this Commission was composed,* and in order to answer once for all the whole series of attacks, it is only necessary to recall their judgment as embodied in their report—namely, that M. Pasteur had discovered a method

* The members of the Commission were Sir James Paget, Sir Joseph Lister, Drs. Brunton, Fleming, Quain, and Burdon Sanderson, Sir Henry Roscoe, and Mr. Horsley (Secretary).

of prevention against Rabies comparable to that of Jenner against vaccination. The absolute nullification of fatal results among persons bitten by mad animals and treated I do not, however, believe to be possible.

Nearly all the individuals treated who have succumbed to the disease developed it during the fortnight following the commencement of the inoculation, owing to the fact that in their case the virus passed probably by the blood-stream to the nervous centres immediately after the bite. Indeed, experience shows that the disease may break out from the first (?) to the eighteenth day after inoculation, and it also demonstrates that in cases of submeningeal inoculation it is extremely difficult to outstrip the disease, because the inoculation period is so short that attenuated cord inoculated subcutaneously and far from the central nervous system has no time to do its work. In such cases, therefore, of extremely short incubation period, it is possible that the treatment may fail. Fortunately, they are rare, even where the bites have been received in the face. As for the few cases which succumb even where the treatment has been completed and has apparently had sufficient time to produce its effects, it is extremely difficult to assign the true cause of such failures, but they may perhaps depend upon the special liability of the individuals in question.

The most remarkable point, however, in the whole discovery of this preventive inoculation against Rabies is that it has been carried out, the virus itself being still unknown. Not only do we not know how to cultivate it outside the body, but, in allowing it to be really a microbe, we can but do so by analogy, for as yet no one has been able to isolate it. Notwithstanding this, however, it is daily being attenuated and made to pass through the various stages of virulence. Unable to cultivate the organism artificially in flasks and tubes, M. Pasteur has been obliged to do so in the rabbit, and so easily and with such perfect regularity are these cultivations in the living animal performed that they are ready each day for use in the inoculations at a specified time and in the condition of genuinely pure cultivations. There is no stronger example of the power of the experimental method applied to medical matters than this one of the prevention of a malady the absolute virus of which is still obscure.

Certain microbes—that, for example, of Anthrax—grow with such tremendous rapidity in the bodies of animals, that at the time of their death their blood contains more parasitic elements than blood-corpuscles. The bacilli form occasionally capillary obstructions, and so act mechanically; but like all living cells, they have their vital products, and with such an enormous number of them it is easy to imagine that these very largely modify the nature of their surroundings. The bacillus of Anthrax, which is specially greedy of oxygen, draws it from the blood-corpuscles, and produces asphyxia of the tissues; but the greatest source of danger from microbes is to be found in poisonous products which they manufacture. A striking proof of this fact is given us by the diphtheritic bacillus, which, notwithstanding that it grows not in the interior of the tissues, but on the surface of the mucous membrane—outside, as it might be called, the body—yet causes death, and sometimes with a frightful rapidity. In this case there is no invasion of the body nor struggle between the cells, but simply poisoning by the products of a very active parasite growing on the border of the false membrane. It is difficult to find in the body of an animal which has just died of an infectious malady these poisonous products of which we have been speaking, as the complex surrounding of tissues is unsuitable for such researches, and the poisons being only present in very small quantities, the animal during life partly eliminated them from its system; it is therefore in the cultivations in flasks and tubes that we must endeavour to find these products of the pathogenic activity of the microbes.

The first experiments made on this subject were originated by M. Pasteur. In order to find out what the action of the products of the Cholera microbe really was upon fowls, M. Pasteur injected into them a large quantity of a culture which had been absolutely purified from the microbes by filtering it through porcelain. The fowl into which this liquid, absolutely free from living virus, was injected, became sleepy, its wings hung down, its feathers stood up, and in fact for several hours it displayed all the symptoms of the disease, after which it recovered. We thus see that the chemical products obtained during cultivation of the microbe are able of themselves to cause the symptoms of the disease, and it is therefore very probable that they are really manufactured by the microbe in the body itself of a fowl attacked by Cholera. It has since been shown that many of the pathogenic microbes manufacture these poisonous products, and the microbes of Typhoid Fever, Asiatic Cholera, blue pus, acute experimental Septicæmia, and of Diphtheria, all belong to this class. The cultivations of the bacillus of Diphtheria in particular become, after the lapse of a certain time, so charged with the poisonous substance that an infinitesimally small dose of it causes death to the animals, with all the characteristic signs observable after inoculation with the microbe itself, no one sign being wanting to complete the resemblance, even down to the gradual encroachment of paralysis where the dose has not been sufficiently strong to ensure a speedy death. In infectious maladies, therefore, the cause of death is poisoning, and the microbe is not merely the means of spreading infection, but is also the maker of the poison.

By introducing little by little into the bodies of animals these chemical substances produced by pathogenic microbes, such, for instance, as that of acute Septicæmia, in such a manner as to avoid causing speedy poisoning, but so as to gradually accustom the animal to its presence, it becomes refractory not only to toxic doses, which would have originally caused death, but also even to the microbe itself; and the immunity which hitherto we could only give by the introduction of a living virus into the body we can now effect by the introduction of a chemical substance into the tissues, and these vaccine substances are exactly those which we have observed in infectious diseases as being the cause of death. In large quantities they kill, in small they confer immunity. These experiments on vaccination by means of soluble substances without microbes have been successful in various maladies, and we may be allowed to hope that their field of utility will become much wider.

I would here recall to you the works of Salmon, on Cholera; of Toussaint, Chauveau, Wooldridge, Chamberland, and myself, on Anthrax; of Charrin, on the Pyocyanic Bacillus Disease; Chamberland and myself, on Acute Septicæmia; Beemer, Brieger, Chantemesse, and Vidal, on Typhoid Fever; and of myself on Symptomatic Anthrax, which have established the principle of vaccination by chemical substances; so that we now see it may be possible to protect ourselves from one malady by means of another, for which purpose it is only necessary that the microbes of the two maladies should manufacture similar chemical substances. The question now arises, Has the animal, the recipient of a sufficient dose of these products, become refractory in consequence of their being present in the tissues, and thus preventing the growth of the microbe? Upon this point, while we do know that in cultivation the growth of certain microbes is arrested by the accumulation of the products which they form there, we must carefully avoid forming a definite opinion as to what happens in the living body upon the basis of phenomena which have been observed to take place in culture tubes. For example, if we take a little blood from a sheep which has been rendered refractory to Anthrax, and place in it Anthrax bacilli, they will grow there

rapidly and abundantly, thus showing that there is in the blood of this protected animal no substance capable of destroying the life of the bacteria. This experiment is, of course, an extremely crude one, since from a chemical point of view there is an enormous difference between blood while still retained within the living vessels, and the same blood drawn from the body and placed in a culture flask. If any positive result were obtained, it could only be from an absolutely enormous chemical change in the composition of the tissues.

A more delicate experiment may be performed by injecting into the anterior chamber of the eye of a protected sheep a few virulent bacilli, which, while growing well in the aqueous humour, will confine themselves to that special spot. It is, therefore, evident that in this aqueous humour, notwithstanding its being a part of the animal, and consequently, of necessity, participating in its chemical modification, there is no substance present capable of resisting the local development and vital activity of the Anthrax bacillus.

Besides the chemical, we have also the physiological question to deal with, as may be seen from the following experiment. If the virus of "quarter evil," that is, *charbon symptomatique*, be injected into the thigh of a rabbit, an animal which is by nature refractory to the disease, no characteristic tumour will develop, and its immunity appears to be absolute. But if now any lesion be first produced in the tissues, either by a blow or by the injection of some caustic substance, and the inoculation be made at that point, then an Anthrax tumour will soon appear, and the rabbit, though habitually exempt from the disease, may chance in this manner ultimately to succumb to it, the reason being, of course, that the injured tissues have formed an inert soil for the microbe to start its growth without hindrance. The immunity, therefore, of a rabbit from "quarter evil" does not arise from its possessing in its body any simple chemical substance inimical to the cultivation of the virus, as we see that it is only by artificially causing necrosis of the tissues that the virus is able to gain a footing in it.

What, then, does happen on the injection of active virus into an animal which is refractory? What becomes of the microbes? M. Metschnikoff has taught us that they are soon destroyed, and that the foremost agents of the destruction are the white corpuscles or phagocytes, which swallow up the microbes and digest them; while, on the other hand, the white corpuscles in the bodies of non-refractory animals do not swallow the microbes, or that, if they attempt to do so, the latter develop notwithstanding.

Any satisfactory explanation of the problem of immunity should comprise all these facts, and should be based upon the relative importance of the action of the chemical products and the resistance of the tissues. I believe that the best explanation, in fact, consists in considering immunity as the result of the habituation of the cells to the poisons secreted by the microbes.

When the virus begins to develop in the body of an animal subject to the malady it forms its poisons, and when the white corpuscles begin to struggle against them their activity is arrested by this toxic production. The microbe continues to develop and the malady progresses. But in the case of an animal rendered refractory by previous injection of the soluble substances or by inoculation of attenuated virus, the corpuscles have already got accustomed to the microbic poison, and since the small doses given at the beginning of the cultivation of the virus do not impede their activity, they commence the struggle and devour the parasites. But if, as in the experiment with "quarter evil," some cause should prevent this corpuscular intervention, the cultivation of the microbe would succeed, and in this local centre there would soon be a sufficient quantity of poison to render the corpuscles powerless, notwithstanding that these have been previously accustomed to it, or possess natural powers of resistance against it.

There is no means of habituating the system to large doses. It is therefore in the time immediately following inoculation that the decisive battle is waged. Hence the great importance of clearly understanding the importance of the condition of the seat of inoculation, and of the quantity of virulent matter introduced. When once we are thoroughly acquainted with these poisonous substances formed by pathogenic microbes, we shall perhaps be in a position to find antidotes for them capable of paralysing their action even within the tissues themselves; but in offering this suggestion I perceive that I have deserted the domain of fact for that of hypothesis, and that it is therefore time I drew my remarks to a close.

It seems to me that the foregoing view of this wide question reconciles the various works upon it, which have been multiplied in the last few years, and though it is possible that it may be modified by time, one thing will remain unchanged, and that is the gratitude of all to him who by his studies of attenuated viruses and preventive vaccinations has enabled us to deal successfully with that problem of immunity which has hitherto remained impenetrable.

THE PHYSICAL CONDITION OF HORSES FOR MILITARY PURPOSES.*

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THE subject which I have the privilege and the honour to introduce to your notice to-day, is one of much interest and importance to all who have to do with horses, whether in the Army or out of it; but more especially does it concern those who belong to the mounted portions of our forces; as upon their acquaintance with it, even to the smallest details, will, to a large degree, depend the efficiency and value of their different corps in peace or in war. And nowhere, perhaps, could such a subject be more fittingly introduced and discussed than in this great centre of our military life, where theories can be tested and knowledge practically applied in all that pertains to the successful utilisation of troops, whether mounted or dismounted. Here, at Aldershot, we have at all times, and in all seasons, a larger number of horsemen and horses than are located in any other part of the United Kingdom; and the training which they undergo, and the tests and fatigues to which they are exposed, brings them nearer to a realisation of what actual warfare is, and what it demands from man and horse, than any other ordeal to which they could be subjected, short of war itself.

The value of horses in land wars is so well recognised, that it would be sheer waste of time to refer to it; but the value of studying their special aptitudes, their fitness for particular services, and how to obtain and maintain this fitness, is not always sufficiently considered; and when this is the case, there is danger that the advantages and benefits which should be derived from them will be only partially available or altogether lost. Whereas, with a good selection of horses for certain services, and judicious management of them, we may derive all that they can yield to man in the performance of the most onerous and severe tasks which may be imposed on them.

How horses can be best and most economically utilised in the Army, is a question which needs the most careful examination; not only because upon the results of it may depend the success of operations in the field, but also because of the increasing difficulty experienced in procuring, in a brief space,

* A lecture delivered before the Aldershot Military Society on January 31st, Major-General Philip Smith, C.B., in the chair.

a sufficiency of horses to complete Army Corps, and replace the heavy losses which are generally inevitable among them on active service. It is this question which I venture to bring before you now; and though I feel as if I owe an apology for my temerity in submitting to you views which can have nothing in the way of novelty in them, yet there may be points which will merit discussion, and differing opinions which it may prove beneficial to reconcile, so as to lead to amendment and improvement in horse management.

The physical fitness or condition of horses for military purposes depends upon several factors, the more important of which may be enumerated as :—

1. Size and breed of horses for special services.
2. Food, with regard to quantity and quality.
3. Care and management.
4. Amount of work exacted.
5. Manner in which the work is exacted.

1. Size and Breed of Horses for Special Services.

There is not much need to insist upon the necessity for our horse supply being of the best possible quality, and well adapted in every way to the requirements of the different branches of our mounted corps. Our country is pre-eminent for its breeds of light and heavy horses, and we should, therefore, expect that our army horses would excel those of any other nation. I think it is questionable if our superiority in this respect is so marked as it ought to be, or if, with regard to at least one army, it exists at all. Perhaps our draught horses have improved somewhat, but we may entertain doubts whether the Cavalry horses have gained much in size and quality during the last quarter of a century. Calling to mind the kind of horses upon which Cavalry soldiers were mounted some thirty or forty years ago, one would feel inclined to express a doubt whether they are so good now as they were then. The opinion might be ventured that the modern system of racing has not proved beneficial to Cavalry horses; and looking through the different regiments, and comparing the past with the present, we fancy we can see the effect of five furlong races upon the troop horses of to-day.

Several things conspire to render these horses less suitable than in former times. Race horses were not bred for short races, but for trials of endurance as well as speed, and as it is to the race horse that we generally owe improvement or deterioration in our light horses, as he deteriorates in size and endurance, so will our Cavalry remounts to a large extent. Again, before the advent of railways, in the days of stage and mail coaches, and when travellers and farmers thronged the roads on horseback, strong good-paced animals, well adapted for Cavalry, were common; now this stamp of steed is almost unknown. Therefore it is more difficult to obtain horses physically fit for Cavalry purposes now than formerly; and though, perhaps, they may show what is termed "Breeding," yet considering what they have to do on active service, grave doubts may be entertained whether they have sufficient bulk and strength to sustain the trials which they would have to undergo.

It is possible that the steps now taken to improve the lighter breeds of horses throughout the United Kingdom, may, in the course of time, give us something like the old-fashioned Cavalry horse, fit to sustain successive days of movement under a heavy load and on short rations.

If it be accepted as a fact that our Cavalry remounts are, physically, not so good now as they were half, or even a quarter of a century ago, we certainly do not make amends for this by the way we treat them. Many are in the ranks doing hard work before they are five years old; and this is not con-

ducive to their soundness or development. It would be in every way better for them if they were not compelled to undergo the fatigues of mature horses until they were five, or even six years of age, and perhaps it would be more profitable to the public. Almost every Cavalry regiment has a number —some of them a large number—of horses too young for service, physically unfit, in fact; and if they were sent into the field they would probably succumb in a short time. Such regiments, though shown as up to their full establishment in horses on paper, are, therefore, not so; they are deficient in proportion to the number of young and old horses in the ranks. If it could be ordered that no horse should be considered physically fit until he had reached at least five years of age, then the casting period on account of age might be extended to eighteen years. Horses do not reach maturity—that is, the maximum of physical fitness—until they are seven or eight years old. When hard worked too soon, they are often worn out by that time; whereas, when allowed to attain their full growth and strength before they are severely tried, they might be able to perform good service up to even twenty years.

Of course, I am speaking of horses which are fairly well bred, of good conformation, in robust health, vigorous and active. It is all important that the army should have such horses. Under-bred animals, whether for draught or saddle, though large enough, are soft in fibre and weak-hearted; they are unable to resist exposure and fatigue, and cannot be trusted on an emergency.

Associated intimately with physical fitness is "Pace." All military horses ought to be smart in movement, and of all the paces which should be found in perfection in them, walking is the one. Good walking, whether in carriage or saddle horses, should be considered as absolutely essential. Though Cavalry horses should also trot and gallop well, yet quick walking is as great a desideratum in them. There is much more of this pace on service than of galloping, and it is perhaps the most trying; it is the pace which, according to an old Cavalry General, "destroys more horses than do the enemy's bullets."

A horse, then, which may be considered physically fit, if of proper size and conformation for the service he is to perform, should be one which looks bright and lively, walks and trots sound and freely, has a shining coat, hard muscles, and eats, drinks, and rests well.

This physical fitness we should find in greatest perfection in our fast-moving horses—in Cavalry and Horse Artillery; for it is upon them that the severest strain is imposed, as they have to move at all paces, and to cover more ground than the heavier horses which generally move at a uniformly slow pace, and have their loads carried upon wheels. In modern warfare the duties of Cavalry will be heavier than in former days, and the brunt of the fatigue will fall upon the horses. Consequently, these horses cannot be too good. Nearly a century ago, a high authority on this branch of the service, when insisting upon the necessity for Cavalry arriving in a fit state on the field of battle, said: "A feeble, delicate horse, shaken by the constant weight it has to carry, and by bad and insufficient food, will be less certain to arrive than a powerful and robust one; or if it does reach the spot, it is exhausted at the very moment when it has need of all its strength. The rapidity of a regiment in the field depends upon the speed of its slowest horses; so that a horse should be able to go at an average gallop."

2. Food: Quantity and Quality.

With regard to food in its relations to physical fitness, we all know that this should be sufficient in quantity, and good in quality; but a fact not often recognised until too late, is that it should also be food to which horses are accustomed.

The quantity should, beyond a certain allowance, be in proportion to the amount of work performed, and perhaps also to the season. In our army,

there is a uniformity in this matter which reduces the question of feeding to the greatest simplicity, though it must be confessed that it is not in harmony with reason or experience. The forage ration is never varied all the year round, no matter how young or how old the animals are, how heavy or how light the work may be (with one or two exceptions to be presently mentioned); and large horses weighing 1,200 or 1,400 lbs. receive the same quantity as those weighing 800 lbs. This ration is, as you are aware :—

If in quarters, oats 10 lbs., hay 12 lbs., straw 8 lbs.
If in encampments, oats 12 lbs., hay 12 lbs.
If employed on draught work, 2 lbs. oats extra.

The extra issue is allowed to horses of the Army Service Corps drawing waggons at a trot; and during the winter months only, for all other draught horses when employed on continuous draught work for a period of at least five hours a day.

An extra issue of 2 lbs. of oats, in addition to the ordinary ration in quarters or in encampments, is allowed to draught horses of the Army Service Corps when these are 16 hands high and upwards.

In Continental armies, the allowance of forage is systematically adjusted to the size of all the horses and the nature of their work.

In the German Army, for instance, there are four scales of forage rations, the difference between them consisting chiefly in the amount of oats. There is, first, the heavy ration, which consists of 11 lbs. $7\frac{3}{4}$ ozs.; second, the ration for Light Cavalry of the Guard, which is 10 lbs. 15 ozs.; third, the medium ration, which is 10 lbs. $11\frac{1}{2}$ ozs.; and fourth, the light ration, which is only 9 lbs. $13\frac{1}{2}$ ozs.

The allowance of hay is 5 lbs. $7\frac{1}{2}$ ozs., and of straw $7\frac{1}{2}$ lbs. $10\frac{1}{2}$ ozs.

These rations are issued as follows :—

The heavy ration is allowed to horses of General Officers, the General Staff, Adjutants, Officers of the War Ministry, Cuirassier and Guard Lancer Regiments, Military Riding School, Guard Horse Artillery and Field Officers of Guard Field Artillery, all Artillery draught horses, those of the Gendarmerie and Intendance, and Transport draught horses. Troop horses of the Gardes du Corps Regiment receive at all times 1 lb. $1\frac{1}{2}$ ozs. of oats, and 3 lbs. $4\frac{1}{2}$ ozs. of hay extra.

The second scale is given to the Light Cavalry of the Guard, Guard Dragoons, and Guard Hussars.

The medium ration is for the Lancer Regiments of the line.

The light ration is for all other troops and the horses of officers not specified.

The above are termed the "Garrison Rations," and are only drawn for horses on the strength; the three or four extra horses in each squadron, battery, and company of Transport, have to be fed on what can be saved from the forage of the others. It is not compulsory to give the horses their full rations daily, but a portion may be reserved for times when work is heavier than usual.

On the line of march the ration is increased as follows :—

Heavy ration to 13 lbs. $3\frac{3}{5}$ ozs. oats.
Light Guard Cavalry ration to 11 lbs. $7\frac{3}{4}$ ozs. oats.
Medium ration to 11 lbs. $4\frac{1}{4}$ ozs. oats.
Light ration to 10 lbs. $6\frac{1}{4}$ ozs. oats.

The heavy ration of oats is accompanied by 3 lbs. $4\frac{9}{10}$ ozs. each of hay and straw for feeding; the other rations having 3 lbs. 4 ozs. of hay, and 3 lbs. $13\frac{1}{4}$ ozs. of straw for the same purpose, as litter is provided in the billets.

In the field this ration is increased all round by $8\frac{3}{4}$ ozs. of oats, each horse then carrying what is called "the iron ration of oats"—nearly 14 lbs. the

heavy ration, over 12 lbs. the second, 11 lbs. 13 ozs. the third, and 11 lbs. 1 oz. the light ration.

During railway transport, each horse is allowed 3 lbs. 4½ ozs. of hay, and 2 lbs. 3 ozs. of straw to lay on the floor and ramp of the waggon. If the journey lasts longer than eight hours, 6 lbs. 9 ozs. of hay is allowed extra for every twenty-four hours.

During Army Corps manœuvres and Cavalry Division exercises for a period of four weeks, the following rations are allowed :—

For Cuirassiers or Horse Artillery draught horses, 12 lbs. 14½ ozs. oats.

For other Line Cavalry Regiments and Horse Artillery riding horses, 11 lbs. 7¾ ozs. oats.

As on the march, 3 lbs. 4 ozs. of hay and 3 lbs. 13¼ ozs. of straw are allowed. (*To be continued.*)

Proceedings of Veterinary Medical Societies, &c

ROYAL COLLEGE OF VETERINARY SURGEONS.

Special Meeting of Council, held June 4th, 1889.

Professor Pritchard, President, in the Chair.

Present—Professors J. W. Axe, W. Duguid; General Sir Frederick Fitzwygram, Dr. Fleming, C.B., Sir Henry Simpson; Messrs. J. D. Barford, T. Briggs, E. C. Dray, J. Roalfe Cox, B. Cartledge, T. Greaves, H. Kidd, W. J. Mulvey, H. R. Perrins, J. F. Simpson, Peter Taylor, W. Wilson, W. Woods, F. W. Wragg; Mr. Thatcher, the Solicitor; and Mr. A. W. Hill, Secretary.

The Secretary read the notice convening the meeting.

Mr. Peter Taylor moved that the minutes of the previous meeting be taken as read.

Mr. Kidd asked, under Bye-law 8, that the minutes should be read.

Dr. Fleming said that the minutes had been published in the journals, and that for a great number of years it had been the custom of the Council to take them as read.

Mr. J. F. Simpson said that, being perfectly acquainted with the minutes of the previous meeting, he expressed no wish one way or another, but he would ask whether it was not a fact when any member of the Council desired the minutes to be read that they must be read.

General Sir Frederick Fitzwygram said that it was quite insufferable to have the time of the Council wasted in such a manner.

The minutes of the previous meeting were then taken as read and confirmed.

Election of President.

Professor Duguid proposed that Professor Axe be elected President for the ensuing year. Professor Axe was so well known that it was needless to make any comments upon his qualifications for the office; and he was the oldest member of the Council who had not hitherto filled the presidential chair.

Mr. B. Cartledge seconded the motion.

Mr. Greaves said that several members of the Council, including himself, had wished to propose another gentleman as President, namely, Mr. Peter Taylor; but out of respect to Professor Axe, and with the desire that the vote should be a unanimous one, no other gentlemen would be proposed. No one could find the slightest fault with the action that had been taken, but the provincial veterinary surgeons felt somewhat aggrieved that so many metro-

politan practitioners and professors should occupy the highest position which could be conferred upon them. He hoped that in future the provincial practitioners should have the honour of electing a President for the Council, if not every other year, at all events more frequently than they now had. Mr. Taylor had been a member of the Council for a great number of years, and he hoped it would be understood that he would be eligible for the office of President next year.

Mr. B. CARTLEDGE said that if Mr. Greaves had any other candidate to propose, the Council were bound to listen to him, but he thought Mr. Greaves was entirely out of order in making such comments.

The PRESIDENT thought it might be taken that Professor Axe was unanimously elected.

Mr. B. CARTLEDGE thought the Council were bound to elect the President by ballot.

Sir HENRY SIMPSON ventured to submit that it was not necessary to ballot, as only one candidate had been proposed.

The motion for the election of Professor Axe as President was then put and carried unanimously.

The PRESIDENT, in congratulating Professor Axe on his election, greeted him to the chair as President for the coming year.

Professor AXE then took the presidential chair.

The PRESIDENT (Professor Axe) said that he appreciated very much the honour that the Council had been pleased to confer upon him. It was natural that one should look forward to occupy the position which so many worthy men had previously occupied. It could not fall to the lot of all, but it might fall to the lot of those who, in their aims and objects, had striven to obtain a high position in the profession. He recognised in their choice of President for the coming year that the Council saw in him one who had aimed at, if not altogether attained to, a high position in their ranks. It had been suggested that perhaps no important measure was likely to come before the Council during the coming year, but he hoped that prophecy would not be realised. Both in the system of teaching and of examining, and indeed in their scientific position, they were only in their infancy, and there was a great deal to be attempted and achieved in the future. It would not do to sit down and be satisfied with things as they were; and he should take it as an ill omen if measures of considerable importance were not brought under their consideration during the year of office on which he was now entering. The profession was becoming more and more alive to the necessity of progress, and it was beginning to recognise the means and methods of progress. There were some difficulties still in existence with regard to the examination of students. They had been told that there was a want of uniformity in the preliminary educational examination. He did not know how far that might be true, but it was desirable that the Council should at least endeavour to remove every suspicion of irregularity in a matter of such moment. It had also been pointed out that the professional examinations were still incomplete, and would continue to be so until a written test was instituted. For himself, he believed that a written test would not only be a great advantage to the student, but a great advantage and security to the examiners; as well as a means by which other important objects could be achieved. The examinations, he thought, sooner or later, would have to be considerably broadened in another direction. The time was not far distant when students would be required to be submitted to a clinical examination, which, he thought, would not only be an incentive to them to become more observant, and necessarily more intelligent, but it would have the tendency to advance the future of the profession. The time had also arrived, he believed, when the question of sanitary science should form part of their system of teaching and examining.

That had been too long disregarded, considering the important nature of the question as it affected our herds, flocks, and studs at the present time. Another point of importance was the practical training of students. It had from time to time been suggested that the means possessed by the schools was insufficient to give students the extent and breadth of practical instruction which it was necessary to possess in entering upon the duties of their profession. He agreed with what the representatives of the schools had from time to time admitted, namely, that it was incompetent for them to make practical veterinary surgeons. It would be for the Council to map out some scheme by which more practical information could be obtained by the student prior to his submitting himself to the final examination. It had occurred to him that perhaps they might reasonably insist upon students devoting their vacation to practical work with veterinary surgeons in practice, before being admitted to the final test. If the eight months at their disposal between the sessions were devoted to that work, a great step would be made towards their advancement. Those, he thought, were some of the practical questions which might usefully be brought before the Council. Although he felt that he might not be able to discharge the duties which devolved upon the President as well as he could wish, he looked forward to that united assistance which members of the Council had always readily conceded to his predecessors on every occasion when difficulties arose in the business of the College. He hoped by their help to accomplish the task of maintaining the dignity and honour of the position which had been entrusted to him.

Election of Six Vice-Presidents.

The names proposed for the election of six Vice-Presidents were as follows:—Messrs. Dray, Woods, Lambert, Briggs, Banham, Walters, Hunting, Blakeway, Wilson, Headley, and Walker.

The ballot was then taken, with the following result:—Mr. Dray, 14 votes; Mr. Woods, 13; Mr. Briggs, 13; Mr. Wilson, 13; Mr. Lambert, 11; Mr. Hunting, 9; Mr. Walters, 8; Mr. Banham, 7; Mr. Blakeway, 5; and Mr. Headley, 5; and Mr. Walker, 2.

Messrs. Dray, Woods, Briggs, Wilson, Lambert, and Hunting were declared to be elected as Vice-Presidents.

Retirement of Treasurer.

Mr. DRAY said that, owing to increased failing health, he was sorry to inform the Council that he felt compelled to tender his resignation as Treasurer. It was with great pain that he made the statement, for he should never forget the great kindness which had been extended to him by the Council. If he should not be thought dictatorial, he would suggest Mr. Wragg as his successor. Mr. Wragg lived in the neighbourhood, and was a gentleman well qualified to perform the duties.

Mr. J. F. SIMPSON said that it was with great regret that he listened to Mr. Dray's announcement. If the Council should decide to accept Mr. Dray's resignation he should have great pleasure in supporting the suggestion that Mr. Wragg should be appointed as Treasurer.

Dr. FLEMING said that last year Mr. Dray had made a similar proposition, but had been induced to retain office with the offer of assistance if necessary. Mr. Dray had been Treasurer so long, and their finances had prospered so well in his hands, that he feared without him as the frontispiece of their financial position the Council would not feel happy. If Mr. Dray would allow his name to be retained as Treasurer he felt sure that Mr. Wragg would gladly render him any assistance that might be necessary. If Mr. Dray could accede to that request it would be a great pleasure to the Council.

Mr. F. W. WRAGG hoped that Mr. Dray would still act as Treasurer, and any assistance that might be in his power to give he should only be too delighted to render.

Mr. DRAY, in thanking Dr. Fleming for his kind remarks, said that if it had not been for Mr. Wragg saying that he was willing to offer assistance should he be absent from ill health, under no other circumstance would he be induced to remain in office. He thought that, generally speaking, a person should not accept office unless he filled the duties to the letter, but if he (Mr. Dray) failed to do so the Council must take the will for the deed.

Election of Secretary and Registrar.

Mr. DRAY moved the re-election of Mr. Hill as Secretary and Registrar. He had no occasion to comment upon how well Mr. Hill had performed his duties, for they spoke for themselves. He was sure the Council would be delighted to re-elect him.

Professor PRITCHARD said he had great pleasure in seconding Mr. Dray's proposition. He would like to take the opportunity of thanking Mr. Hill for the way in which he had acted as Secretary during his year of office. He had known Mr. Hill ever since he had been Secretary, but of course he had come into closer contact with him during the past twelve months than he had done before, and he could only say that he had found everything in Mr. Hill in the shape of assistance that he could possibly desire. If he were permitted to give his successor to the chair a hint, he might tell him that he would be very well waited upon, and that he might rely to a very considerable extent upon the services of the Secretary.

The motion was unanimously adopted.

Mr. A. W. HILL (Secretary) acknowledged the kind sentiments which had been expressed towards him. His best endeavours would be always to carry out the wishes of the Council. The work naturally increased year by year, but with their kind assistance all the difficulties would be mastered. He thanked the Council most sincerely for his re-election.

Vote of Thanks to the retiring President.

Dr. FLEMING said that it was with great pleasure that he rose to pass a vote of thanks to the retiring President, Professor Pritchard. The duties of the President were heavy, and if they were not numerous they were sometimes extremely pressing. During recent years these duties had become still more onerous, owing to the number of committees which were sitting, and therefore the tax upon the time, patience, and judgment of the President was a serious one. During the past year they had been fortunate in having a President who had been able to attend all the Council and the Registration Committee meetings. He thought from the manner in which Professor Pritchard had discharged his duties, firmly, generously, and kindly, that he commended himself to the Council as deserving a hearty vote of thanks. He had much pleasure in proposing that the retiring President be awarded a vote of thanks for the manner in which he had conducted the duties of the chair during the past year.

Mr. BARFORD, in seconding the motion, referred to the courtesy and urbanity with which the chair had been filled during the past year, which, he said, reflected considerable credit and honour to their past-president.

The motion was unanimously agreed to.

Professor PRITCHARD, in acknowledging the compliment, thanked the Council for the kind expressions of opinion with reference to the way in which he had filled the chair during the past year. As Dr. Fleming had said, there had been plenty to do to occupy both mind and time. From the

first moment he had the honour of occupying the chair the work had been a labour of love, and if he had succeeded in gaining the good opinions of the members of the Council he felt fully repaid for any little time and trouble he might have spent in carrying out the duties of his office.

Notice of Motion.

Mr. WILSON stated that on a subsequent occasion he should give notice that he intended to call attention to pages 60, 61, and a portion of 62 of the bye-laws in connection with the regulations of the examination of students before they entered.

On the motion of Mr. Dray, seconded by Dr. Fleming, a vote of thanks was passed to the President, Professor Axe, for his conduct in the chair.

EXAMINATIONS OF THE ROYAL COLLEGE OF VETERINARY SURGEONS.

AT meetings of the Court of Examiners held in Glasgow and Edinburgh on and between May 21st and 30th, 1889, the following gentlemen passed their Final Examination, and were admitted Members of the Royal College of Veterinary Surgeons :—

Glasgow Veterinary College.

Mr. H. Ross	Invergordon, Ross-shire.
,, J. W. Pealt	Rockavy, Monaghan.
,, W. Smyth	Katesbridge, Co. Down.
,, H. J. Windsor	Govan, Glasgow.
,, C. B. Freeman	Dublin.
,, D. C. McCambridge	Randaltown, Co. Antrim.
,, J. Gregg	Dromara, Co. Down.
,, J. R. O. Reali	Cashel.
,, M. Wilson	Mendota, Illinois, U.S.A.
,, D. Wamock	Glasgow.
,, J. Graham	Londonderry.
,, R. Anderson	Glasgow.
,, R. K. Hart	Glasgow.

Dick Veterinary College, Edinburgh.

Mr. H. G. Rodgers	Leicester.
,, F. Barling	Ross, Herefordshire.
,, F. J. S. Clarke	Gosport, Hants.
,, P. Connacher	Perth.
,, J. Christy	Limerick.
,, A. Dowdall	Liverpool.
,, F. T. Finney	Newcastle-on-Tyne.
,, R. W. Glaister	Cockermouth.
,, J. R. Jones	Hackelstown, Carlow.
,, C. B. Langran	Cork.
,, John Lyons	Mallow.
,, J. Manuel	Edinburgh.
,, J. C. McAleer	Stewartstown, Tyrone.
,, H. G. Mottam	Redford, Notts.
,, A. Richardson	Oxford.
,, J. G. Gilmour	Bailieborough, Co. Cavan.
,, J. C. Rowlands	Oswestry.
,, A. S. Wallace	Arbroath.
,, C. D. Watkins	Tredegar, Monmouth.

New Veterinary College, Edinburgh.

Mr. J. Caldecott	Knutsford, Cheshire.
„ J. W. Schofield	Manchester.
„ A. Reah	Preston.
„ W. Wright	Kelso.
„ O. T. Williams	Holyhead.
„ E. Kellett	Ruthin, Wales.
„ E. H. Curbishley	Stockport.
„ A. D. Minor	Manchester.
„ R. D. Davidson	Watten, Caithness.
„ F. Hutchinson	Howden, Yorks.
„ W. Eaton	Melton Mowbray.
„ J. W. Rider	Richmond, Yorks.
„ W. A. McDougal	Jedburgh.
„ W. F. Shore	St. Boswell's.
„ W. Stothert	Manchester.
„ T. M. Parker	Wigan.
„ F. Dales	Howden, Yorks.
„ J. Barker	Burnley, Lancs.
„ T. G. Duggle	Liverpool.
„ J. B. Robertson	Bradford.
„ F. Booth	Abergele, Wales.

The following passed their Second Examination:—

Glasgow Veterinary College.

Mr. P. Gillespie, G.C.
„ T. Jarvie, G.C.
„ D. Clerk.
„ J. Watson.
„ J. Bishop, G.C.
„ W. Ledger, G.C.
„ A. Millar, G.C.
„ R. Weir, G.C.
„ W. McMurrick, G.C.
„ A. Hill.
„ P. Connoly.
„ J. K. Thompson.
Mr. L. Crook, G.C.
„ C. Squair, G.C.
„ W. Davidson, G.C.
„ W. Logan, V.G.C.
„ A. Renfrew, V.G.C.
„ D. J. Austin, G.C.
„ J. Kirk, V.G.C.
„ J. K. Bruce, G.C.
„ T. Trotter, G.C.
„ G. Waddell, G.C.
„ J. Thompson, V.G.C.
„ W. Erskine.
Mr. T. Dunn.

Dick Veterinary College.

Mr. W. J. McCartan.
„ J. Boase.
„ R. St. John Walley.
„ A. C. Gray.
„ C. Carrick.
„ J. Crone, G.C.
„ W. Weston, G.C.
„ W. Williams.
„ R. G. Robertson.
Mr. E. Bowman.
„ D. Woods.
„ J. Higginson.
„ D. Stranaghan, G.C.
„ G. F. Ferguson.
„ H. Kenny.
„ A. Breakell, G.C.
„ A. Paterson, G.C.
„ E. Goodman.

New Veterinary College.

Mr. J. Hume.
„ J. M. Maxwell.
„ A. McGregor, G.C.
„ E. Neilson.
„ E. Murray, G.C.
„ E. Fern.
„ J. Brand, G.C.
Mr. J. H. Parker, G.C.
„ W. S. Lamont, G.C.
„ A. Prestwick.
„ R. Bell.
„ J. Cockburn.
„ H. H. Baker.

The following passed their First Examination :—

Glasgow Veterinary College.

Mr. W. Packmann.
„ R. Ward.
„ R. Campbell.
„ W. Marshall.
„ J. Neill.
„ W. Galloway, G.C.
„ J. Forrest, G.C.
Mr. J. E. Johnstone, V.G.C.
„ J. Jordan.
„ S. C. Pettie.
„ J. D. Walker, V.G.C.
„ J. Gilruth, V.G.C.
„ J. Douglas, G.C.

Dick Veterinary College.

Mr. V. Bankes.
„ J. W. Hudson.
„ J. J. Griffiths.
„ P. J. Mullane, G.C.
„ H. Eve.
„ J. A. Moore.
„ J. C. Paton, G.C.
„ W. Hamilton.
„ W. Stewart, G.C.
„ J. Davidson, G.C.
„ J. Tanish, G.C.
„ E. W. Thorburn.
„ J. Carmichael.
„ Alex. Pettie, V.G.C.
„ T. Maughan.
„ W. J. Richardson.
Mr. R. Holmes.
„ W. Pye, G.C.
„ J. Garvie.
„ W. Sturdy, G.C.
„ R. Hyde.
„ J. Loughran.
„ T. R. Hoggan, G.C.
„ J. Kerr.
„ J. Brown.
„ M. Pottie.
„ J. Pringle, G.C.
„ G. A. Thompson.
„ J. Henderson, G.C.
„ D. S. Davidson.
„ A. Burnfield.
„ C. Baxter, G.C.

New Veterinary College.

Mr. F. Argyle.
„ D. J. Elias.
„ A. Ellison.
„ C. Haywood, G.C.
„ J. Carpenter.
„ J. M. Young.
„ J. Connachie.
Mr. R. M. Pender.
„ J. Farmer.
„ M. Fitzgibbon.
„ R. Eaglesham, G.C.
„ J. H. Siddle.
„ R. E. Johnstone, G.C.
„ A. G. Todd.

At a meeting of the Court of Examiners of the Royal College of Veterinary Surgeons, held in London on and between May 14th and 17th, 1889, the following students from the Royal Veterinary College passed their Oral and Practical Examinations, and were admitted Members of the Profession :—

Mr. W. Rattee.
„ C. F. Hulford.
„ C. E. Williamson.
„ J. McJamieson.
„ W. A. Byrne.
„ W. Cakebread.
„ J. H. Bell.
„ H. Watkins-Pitchford.
„ B. J. Rees.
„ F. B. Vanderplank.
„ G. L. Harber.
„ I. Millward.
„ A. de Sueur.
„ E. W. Oliver.
„ C. J. Callow.
*Mr. E. E. Martin.
„ H. D. Chorlton.
„ J. Wilson-Barker.
„ G. T. Cannon.
„ S. Vincent.
„ C. A. Malvisi.
„ R. H. Singleton.
„ A. Porritt.
„ E. P. Owen.
„ J. Codrington.
„ F. C. Gavin.
† „ J. Golledge.
„ T. Ludlow.
„ E. D. Johnson.
„ H. H. Millward.

Mr. Thos. Slipper.
* „ J. W. Coe.
„ A. G. Seath.
„ A. Bramall.
„ I. Wilson.
Mr. F. W. Emery.
„ J. Beauland.
„ W. A. Welch.
„ G. H. Williams.

The following passed their Second Examination :—

Mr. W. R. Kennedy.
„ C. M. Robinson.
„ W. E. Brame.
„ F. H. Jenkins.
„ E. E. Stokes.
„ W. K. Stuart.
* „ F. W. Greenlaw.
* „ H. J. R. Pope.
„ F. Gale.
* „ W. N. Wright.
* „ R. W. Davies.
* „ H. B. Knight.
„ A. W. Reid.
* „ L. C. Welfare.
„ T. J. Carless.
„ E. H. Simmons.
* „ F. L. Somerset.
† „ J. Row.
† „ J. C. Garry.
„ A. Wall.
„ A. Smith.
„ F. Gregory.
Mr. W. H. Williamson.
„ E. Morgan.
„ C. H. Cordy.
* „ P. C. Woolston.
„ A. H. Jones.
* „ C. B. Harris.
„ F. H. Potts.
* „ E. J. Fowler.
„ H. S. Smith.
* Capt. G. H. Farrell.
Mr. J. B. Tutt.
„ F. S. H. Baldry.
* „ M. A. Hutchence.
† „ F. M. Hill.
„ G. F. Bushman.
† „ F. H. R. Bumbury.
* „ T. F. Spencer.
* „ F. E. Place.
„ D. G. Davies.
„ C. Harwood.
* „ W. F. Howes.
„ D. Pugh.

The following passed their First Examination :—

Mr. T. McCaffrey.
„ C. W. Brown.
* „ G. C. Lowe.
„ G. M. Pomery.
„ W. Collinson.
„ H. A. Sullivan.
„ A. H. Lane.
„ A. G. Tegg.
„ W. H. James.
* „ A. P. Case.
„ S. F. H. Thorn.
† „ F. S. Sikes.
„ W. B. Edward.
„ J. H. Lockwood.
* „ T. Kemp.
† „ V. D. O. Brown-Morrison.
„ A. G. Hillier.
„ P. J. Welch.
„ H. F. West.
„ W. Miles.
* „ W. P. Horsley.
„ C. S. Ware.
* „ W. N. Dobbing.
* „ J. Maguire.
„ T. J. Arman.
Mr. J. W. Wadsworth.
† „ T. A. Ford.
„ D. P. Davies.
„ W. W. Grasby.
† „ J. W. Reynolds.
„ A. M. Ward.
„ J. Toms.
„ H. S. Sawyer.
* „ J. H. Taylor.
„ G. T. Norman.
„ M. T. Sadler.
„ A. E. Clarke.
„ F. T. G. Hobday
„ A. E. Bayley.
„ A. I. Cattell.
„ A. Crofts.
„ C. C. Abrams.
„ J. E. Wallis.
* „ G. H. Williams.
* „ C. R. Edmonds.
* „ J. H. Shepherd.
„ J. H. Manton.
„ G. J. Harvey.
„ M. Fortescue.
„ J. D. Martin.

Mr. A. England.	Mr. F. B. Eve.
* „ W. T. Cade.	„ E. R. James.
„ F. W. Wilson.	„ A. B. R. Battye.
„ H. Sessions.	† „ W. R. Mills.

Marked thus * passed great credit.
„ „ † „ very great credit.

R. RUTHERFORD, F.R.C.V.S.,
Secretary, Court of Examiners.

CENTRAL VETERINARY MEDICAL SOCIETY.

AN Ordinary General Meeting was held at the First Avenue Hotel, Holborn, on 6th of June, Alfred Broad, Esq., the president, in the chair. There were present Professor Axe, Messrs. Banham, Elworthy, Gostling, Herron, Hunting, Hurndall, T. E. W. Lewis, Oatway, Rogers, Roots, Rowe, Samson, Simpson, Fred. Smith, Villar, Wheatley, Willis, Woodger, Wragg, and Wright.

Letters of apology for non-attendance were received from Professor Walley and Messrs. Prudames and Slocock.

Mr. GEORGE REDDISH, M.R.C.V.S., of 103, Stockwell Road, London, was unanimously elected a fellow of the society.

The PRESIDENT announced that a special meeting of the society would be held on the 4th of July, to take into consideration a report of the Council, as to certain Fellows whose subscriptions were much in arrear.

Mr. HERRON introduced a *post-mortem* specimen, consisting of a tooth-like growth upon a horse's ear.

Professor SMITH then addressed the meeting on "Our present knowledge of Navicular Disease."

The President, Professor Axe, and Messrs. Rowe and Hunting, took part in the discussion, on the conclusion of which Mr. SAMSON proposed and Mr. ROWE seconded a vote of thanks to Professor Smith for his address, which was unanimously carried.

S. VILLAR, *Secretary.*

MIDLAND COUNTIES VETERINARY MEDICAL ASSOCIATION.

A QUARTERLY MEETING of the Midland Counties Veterinary Association was held on May 24th, 1889, at the Star and Garter Hotel, Wolverhampton.

The PRESIDENT (Mr. Beddard, of Wolverhampton) occupied the chair, and there were also present: Professor Axe, Messrs. White, Wiggins, Wragg, Over, Coe, Cole, Blunt, Price, Barnes, Hodgkinson, Tailby, Fairbank, Pemberton, Lane, Turber, Barber, Goodall, Pritchard, Sen., Pritchard, Bailey, Collett, Dawes, Leather, James Blakeway, John Blakeway, F. Blakeway, Hodgkins, Carless, W. S. Carless, Perrins, Verney, Faulkner, Freer, Gorden, Smith, Reynolds, Jones, Stanley, Taylor, Cartwright, Wartnaby, Trigger, Parker, Merrick, Capt. Russell, Rossell, Paby, Chambers, and others.

Letters of apology for non-attending were received from Professors Pritchard, Williams, Walley, Sir H. Simpson, Dr. Fleming, Messrs. Locke, Hunting, Olver, Hill, Pyatt, Bryer, Dale, Barling, Banham, Kidd, and others.

Before the business of the meeting commenced, the President (Mr. Beddard) entertained the whole of the company present to a sumptuous luncheon in the Star and Garter Hotel. In a few well-chosen and felicitous remarks he gave the members a most cordial and hearty welcome to Wolverhampton. After ample justice had been done to the good things provided, the members removed to another room and the meeting commenced.

The first business was the nomination of new members :—The President proposed and Mr. Trigger seconded the election of Mr. Herbert Lloyd

Pemberton, of Bridgnorth. The President proposed and Mr. Smith seconded the election of Mr. David Fairbank, of Lichfield. The nomination of Mr. George Henry West, of Newent, Gloucestershire, was made by Mr. Malcolm and seconded by Mr. Wragg. Mr. John Blakeway proposed and Captain Russell seconded the election of Mr. Wright, M.R.C.V.S., Hospital Surgeon to the Royal Veterinary College. The nomination of Mr. J. E. Cartwright, of Skinner Street, Wolverhampton, was made by Mr. Carless, of Worcester, and seconded by the President. These nominees were all unanimously elected.

Mr. BLAKEWAY returned thanks to those members of the Association who had voted for his election as a member of the Council. He expressed some regret that he had not been chosen, inasmuch as the position was an honourable one; also on the ground that, having partly retired from the profession, he would have had plenty of time to devote to the duties of the office. He thought it was extremely important that a member of the Council should be a person who could attend its meetings regularly, and he drew attention to the fact that, during the eight years of his connection with that body his attendances would be found to have compared very favourably with those of any other member.

The PRESIDENT said that the next business on the agenda was the revision of the rules of the Association; but that as there were three horses to be operated on, it had been suggested that this question might advantageously be postponed until their next meeting. He would like, however, to mention the case of one rule, so that members might turn it over in their minds before the next meeting. It had reference to the hour of meeting, which was now 2.30. A great many members had urged that if they began the meeting at 2 o'clock and dined at 5, instead of 5.30, members who had long journeys to make would be greatly convenienced.

On the motion of Mr. MERRICK, seconded by Mr. STANNER, it was resolved that the revision of the rules should be adjourned to the next meeting of the Association.

The PRESIDENT announced that Mr. Wragg had very kindly brought to the meeting an interesting specimen of diseased kidney, but had consented to defer opening a discussion on the subject of kidney diseases till the next meeting, when, the President hoped, they might be able to go more fully into the matter than they could possibly do on the present occasion.

The PRESIDENT then delivered his inaugural address, which he prefaced by congratulating the Association on the presence of Professor Axe, and the fact that he was to perform a new operation for the cure of Roaring. Having this in view, the address would be curtailed as much as possible:—

Mr. VICE-PRESIDENT and GENTLEMEN,—In accepting the presidency of our Midland Counties Association, I assure you I value most highly the honour you have conferred upon me, and feel most deeply the importance and responsibility of my position. The knowledge of my own inability to perform the various duties to your satisfaction has been a source of great anxiety, and I therefore ask you, gentlemen, to kindly bear with me in my shortcomings, and believe me when I say it will be my most earnest and anxious endeavour to maintain the prosperous condition of the Association, and uphold the dignity of the presidential chair.

Veterinary associations have undoubtedly become most useful and powerful institutions, and with regard to our own, the Midland, I often think it must be very gratifying to those members who—no doubt with a vast amount of trouble, and often great disappointment—assisted in its foundation, to have watched its steady onward progress and its ever increasing usefulness, and considering the grand and noble cause for which it was first founded—that of promoting, or I would rather say, increasing the good feeling and social intercourse amongst its members, in addition to the imparting of knowledge and

the advancement of science—I think we should look back with feelings of gratitude to those first workers in the good cause.

I was very much struck with a remark that fell from the lips of Professor Pritchard at our last Annual Meeting. In speaking of the increased interest taken by the members in general, in what I may term "the political work of the profession," he said, when he was first elected to serve on the Council, he received nine votes; since then one member has received upwards of 900, and I see by the return this year 5,079 votes were recorded. Professor Pritchard said he believed this increased interest was due to the excellent work done by the various associations; and if this is so, and I am quite of opinion it is, it only shows the great and increasing value of such institutions.

In taking a short review of the veterinary profession, I think we can honestly congratulate ourselves upon having made great progress, both socially and scientifically. I know there is a difference of opinion as to whether or not our improved social position has anything whatever to do with our professional advancement, and I cannot for one moment imagine how such a difference of opinion can possibly exist. We are not all endowed with the gift, nor have we the opportunity of obtaining that scientific knowledge likely to benefit and advance the profession; but we all, simply as practitioners working in and for a grand and noble profession, have our opportunities of, and responsibility in maintaining and advancing our professional status. I consider every member who "either professionally or socially," by his high, honourable, and dignified conduct, gains the confidence and approval of the public, has at least done something for the future benefit of his profession. I am pleased to believe there is a greater observance than heretofore of that professional etiquette amongst practitioners which must exist if we are to progress, and I believe this is greatly due to the good work done by our medical associations. At the same time, I am bound to admit there is yet something very unsatisfactory; but I trust that by a higher educational standard and continued good work done by our Association, the evil will soon be remedied.

I would like to say a word with regard to the action lately taken respecting hereditary disease in entire horses. It is undoubtedly a step in the right direction, and certain to lead to good results, and I am very pleased to see the determination shown by the examiners at shows to carry out their duties without fear or favour; but, in my opinion, the restrictions are not carried far enough. I consider that no horse should be permitted to travel publicly if suffering from an hereditary disease, and I believe the time is not far distant when this will become law. It is a disgrace to our country to see some of the unsound animals travelling in our midst, spreading disease in every direction, and thus causing loss and disappointment to those obtaining their services; and I believe if we, as veterinary surgeons and advisers, were to take a prominent part in the suppression of the evil, we should receive the thanks and approval of the horse-loving public, and of the owner of every sound and honest entire horse.

There is a subject that has lately received a great amount of attention, both from the public and scientific bodies—the transmission of disease to the human subject from the consumption of diseased meat or contaminated milk. It is a subject of vital importance, and affords a most extensive field for study and research. I am much inclined to think the latter (milk) is frequently the source of evil, and from the great alteration that has lately taken place with regard to the place of its production, I am afraid it will become more dangerous unless some active steps are taken; hitherto large quantities of milk have been produced in towns, where the cow-sheds were under strict supervision and, apart from the owner's interest, were compulsorily kept in a sanitary condition. The bulk of our milk supply to large towns and cities now goes direct from the farm-houses, and from my knowledge of them and their

sanitary condition, I am afraid there is much greater danger. The cow-sheds upon many farms are old and badly constructed; there is little ventilation and still less drainage; the manure is allowed to accumulate in large quantities immediately outside the door, the soak from which frequently forms a small pool, and very often the cows are permitted to drink it—and, strange to say, they will drink it freely. As a rule, a large number of animals are kept; consequently the milking process occupies a considerable time, during which a great portion of the milk is exposed to these contaminating evils. I perhaps should not have mentioned this, had not a disastrous case of fever recently occurred within two miles of where we are seated, and I thought it a practical subject worthy of thought and inquiry.

There are several other subjects I should have liked to have touched upon, but as our time is limited for the interesting operations to be kindly performed by Professor Axe, I close by thanking you for the patient hearing you have accorded my crude and, I am afraid, uninteresting remarks, and I again thank you for granting me the opportunity and privilege of reading this, my inaugural address.

The PRESIDENT said that before they left they had a very important duty to discharge. He had a pleasing task before him, and he was sure that every member would join him very heartily in it. He asked them to support him in according the very best and warmest thanks to their retiring President for the very able and courteous manner in which he had presided over their meetings and conducted the business of the Association during his year of office. They knew that Mr. Trigger, during his presidency, had been the means of bringing before them some very interesting and instructive papers and subjects for discussion. He could testify that the retiring President had spared neither time nor trouble, nor—if he might be permitted to say so—expense, in endeavouring to carry out the duties in an efficient and dignified manner, and he thought that all the members would agree with him that Mr. Trigger had succeeded admirably in those endeavours. He had the very greatest pleasure in proposing a hearty vote of thanks to Mr. Trigger on his retiring from the presidential chair. They hoped that he would long live to adorn the veterinary profession, for whose advancement no one could have greater desire than Mr. Trigger had.

Captain RUSSELL seconded the motion, remarking that the retiring President had carried out his duties in a very able manner, and had shown himself the very man for the office.

Mr. MERRICK (Northampton) endorsed all that had been said by the President and the seconder of the motion. They had never had a more genial President. A more able man in the chair he had never had the pleasure of sitting under.

Mr. BLAKEWAY, as one of the senior officers of the Association, could entirely bear out all the remarks that had been made with regard to Mr. Trigger's performance of the duties of President. Mr. Trigger had done everything he possibly could to facilitate the work of the Hon. Secretary and Hon. Treasurer, and to promote the success of the Association generally.

The motion was carried by acclamation.

Mr. TRIGGER, in reply, said that he felt quite overwhelmed with the very kind reception they had given to the vote of thanks which their President had so ably and so kindly proposed—proposed in terms which he was sure he had failed to deserve. They had far more than repaid him for the time and trouble he had devoted to their interests, by their very cordial appreciation of his poor efforts. His year of office was universally pleasant, for he had received the greatest kindness and courtesy from every member of the Association. If there was one duty more pleasant than another during his year of office, and one that had already given evidence of its success, it was

that of proposing his successor. Their President's address that day and the reception he had met with assured them that if he (Mr. Trigger) had given satisfaction, his successor would far surpass him. In conclusion, he would say that he could not have got through his year of office so satisfactorily but for the great assistance he had received from their Honorary Secretary. He begged to propose that the thanks of the Association be given to the Secretary and other officers for their services during the past year.

Mr. OVER (Rugby) seconded the motion, which was carried unanimously.

The members then adjourned to the President's yard in Cleveland Street, where they witnessed a successful performance by Professor Axe of the new operation for the cure of Roaring upon three "roarers."

During the course of the operations, running comments were made by the Professor, each part being named as the knife passed through it, and special points of difficulty being briefly dwelt upon. After the completion of the operation, the Professor received quite an ovation, and was specially complimented by many present on the wonderful dexterity, surgical skill, and rapidity with which the operations were performed. The Professor then gave a short address on the after treatment, and gave instructions that the tampon cannula should be removed twenty-four hours after the operation; that afterwards antiseptic spray be thrown into the larynx three or four times each day, and the external wound kept clean, and any exuberant granulations cauterised. In four to six weeks the wounds would be healed, but ten weeks should be allowed to transpire before any test was adopted for trying the patient's wind.

The members afterwards dined together, and spent a very pleasant and enjoyable evening. Several songs were sung by Messrs. Leather, Faulkner, and other members present.

The usual toast list was gone through, and that of the President was received with musical honours and three times three, and thus a very happy and instructive meeting was brought to a close.

JNO. MALCOLM, *Hon. Sec.*

ROYAL SCOTTISH VETERINARY ASSOCIATION.

A QUARTERLY MEETING of this Society was held in the library of the Royal Veterinary College, Edinburgh, on May 1st, 1889.

The PRESIDENT (A. Reid, Esq.) occupied the chair.

The following members were present:—Professors Walley, McFadyean, and Baird; Messrs. Campbell, Pottie, Barclay, Baird, Combe, Scrymgeour, Fingzies, Young, and Fairbairn.

The minutes of the last meeting having been confirmed, the following gentlemen were elected members of the Society:—Messrs. Young, Harle, Bird, Cowan, and King, proposed by Professor McFadyean, and seconded by Mr. Barclay.

Professor Walley nominated for election Mr. Baines, Golspie.

The Secretary nominated for election Mr. King, Ayr.

Mr. Pottie, Paisley, then exhibited and explained a form of truss he had invented for the treatment of inguinal and scrotal hernia, claiming for it a distinct advance on the treatment of that form of hernia.

Mr. Campbell, Kirkcudbright, then explained and exhibited his form of truss, which appeared to be of a more simple form, and had been found by Mr. Campbell to have the desired effect.

A very interesting and profitable discussion ensued, most of the members taking part.

Professor WALLEY directed attention to several matters of professional interest.

(1) He exhibited a colossal diagram of a transverse section of a pleuro-pneumonic lung of a cow which had been subjected to the influence of boiling, and explained that very many years ago he directed the attention of his class to this method of dealing with the lung in cases where a doubt existed as to the nature of the lesion, the plugged condition of the vessels, the thickened state of the peribronchial tissue, and the bronchial mucosa; the thickening of the interlobular tissue and the consolidation of the lobules all being brought out in a much better manner by this method than by any other that could be adopted, and that too owing to the coagulation of the large quantity of albuminous matter which was arrested in the meshes of the different tissues involved in the lesion.

(2) He exhibited a large section of a multilocular (hydatid) cystic liver from a cow, in which the whole of the liver structure had been removed by the pressure of the cystic growths which were grouped together in a compact mass; giving the external surface a "paving-stone" aspect, and the surface of the section a "cavernous" aspect. The case came under the observation of Mr. John Roberts, of Wrexham, under whose treatment the cow had been for a short time prior to death. The symptoms were ambiguous, the most striking being a rotund appearance of the body, great emaciation, and excessive diarrhœa. On making a *post-mortem* examination, Mr. Roberts found an enormously enlarged liver, the gross weight of which was 1 cwt. 2 qrs. 5 lbs., a weight, Professor Walley remarked, far in excess of anything which had ever come under his personal observation, and from the extensive annihilation of liver tissue, the wonder to him was that the animal should have lived so long as she had done.

(3) He exhibited a number of monstrous lambs, and remarked that while the present season was probably one of the best lambing seasons, both for number and quality of lambs, it had been very prolific of monstrosities. The most interesting cases cited by him were (*a*) a pesocephalous monstrosity, in which on the anterior surface of the aborted head was seen a transverse irregularly shaped fissure, from either commissure of which a perfect (external) ear opened in a lateral direction. This specimen had been secured for him by the assistant inspector at the slaughter-house, Mr. Duoic. (*b*) A perosomian monstrosity, in which the head and thorax were single, and the posterior, dorsal, and the lumbar region were double, with eight legs, two tails, and four ears, one pair of which had their origin from a common base in the centre of the forehead. This specimen had been forwarded by Mr. Murray Lornie, of Alyth. (*c*) A monocephalian monstrosity, in which the head, neck, and forelegs were wanting, and the thorax fissured. Dissection revealed entire absence of thoracic and of urinary organs, of stomach, and, with the exception of scrotum and testicles, of generative organs. These testicles were situated one on either side, intimately attached to the reflected angle of the posterior false ribs. This specimen was forwarded by Mr. E. H. Jones, Mossley, Manchester.

Mr. Campbell's case was a polymelian or parasitic monstrosity.

Purpura Hæmorrhagica.

Professor Walley introduced the subject of Purpura, a disease which he said had raged to an unparalleled degree during the autumn and early winter months.

In the experience of most practitioners a few cases of the disease were annually met with, but the number of such cases—at least within a tolerably large area around Edinburgh—had never been so great as during the above-mentioned period. Purpura was not to be dreaded when influenza, strangles, and allied affections were prevalent, and when barometrical and local hygienic conditions were unfavourable, but during this season the affection

had assumed the proportions of an enzooty, and the cases were of an unusually intractable character. As the members had all probably experienced, there was in the autumn an epizooty of influenza of a comparatively mild type and of a catarrho-bilious character, and strangles also had prevailed to a tolerably large extent ; indeed it was as a sequel to the latter disease that many of the cases of Purpura had arisen, but in others—and he (Professor Walley) wished particularly to direct their attention to this point—the affection had made its appearance in animals in whom no (or only very slight) premonitory symptoms had been observed.

In reference to strangles, he might remark that during the autumn he had his attention directed to an outbreak in which eighteen out of twenty horses were affected, and in whom there was almost universally suppurative cellulitis, with the formation of unlimited abscesses in various parts of the body, and in only three or four of the animals did the disease run through its usual course. As the members had probably noticed, Mr. Malcolm, of Birmingham, had recently placed two outbreaks of a similar character on record.

As a sequel of strangles the first case which came under his notice occurred in a horse about which he was consulted by Mr. F. Tonar, M.R.C.V.S.

The symptons presented were those of septicæmia, combined with those of purpura, and from the general condition of the animal and the state of the buccal cavity, he (Professor Walley) expressed the opinion that they might expect at any moment symptoms of enteric disorder, followed rapidly by death.

He was at once informed that enteric symptoms had been shown several days previously, and that treatment for their amelioration had been adopted. This horse succumbed to the effects of the complicated disorder from which he was suffering in a few hours after his (Professor Walley's) visit, and on *post-mortem* Mr. Tonar found extensive disease of the great colon, which on being examined revealed a condition allied to that which is sometimes met with in cases of so-called enteric fever, viz., the formation of large sloughs of the intestinal mucosa and the submucosa. The condition so much resembled that shown in a sketch which he had had taken many years ago, and which he submitted for their inspection—as well as the specimen of which it was a representation—that he did not think it necessary to preserve it for their inspection.

On the 5th of December Mr. Barclay forwarded the stomach and a portion of the duodenum of a four-year old carriage gelding in which purpuric lesions were marked, and which (although it was considerably altered by preservation) he submitted for their inspection. When fresh the conditions presented were extensive hæmorrhagic and serous infiltration of the whole structure of the organs, the intramural distribution of the lesions imparting a stratified character to the section. In thickest parts the swelling was two inches in extent. The history of the case, as detailed by Mr. Barclay, was as follows :—The horse had been the subject of strangles for a period of three weeks. Early in the morning of the 3rd (3 a.m.) Mr. Barclay was hurriedly summoned to see the patient, the messenger stating that he had been rolling about since 7 o'clock the previous evening. On his arrival Mr. Barclay found all the symptoms of gastric tympany and gastric pain present, and treated the horse for these, relief being afforded in about an hour, from which time the animal stood in one position until death—which took place two hours subsequently—supervened. From the symptoms presented Mr. Barclay came to the conclusion that the horse was suffering either from gastric, intestinal, or diaphragmatic rupture. *Post-mortem* revealed a rupture, eighteen inches in extent, of the great colon in addition to the gastric lesions. The pyloric orifice was occluded by a large clot of blood which had been thrown out from the vessels of the mucous membrane.

About the same time he (Professor Walley) and his colleague (Mr. Baird) had under their joint care a desperate case following a period of several weeks of apparent convalescence from strangles, and in which tracheotomy had to be performed in order to prevent suffocation from bronchial effusion, and in the same establishment they had another horse convalescing from a severe attack of the disease (after influenza), in which lung lesions had been succeeded by putrid disintegration of the damaged lung tissue. He (Professor Walley) could not pretend to offer a satisfactory explanation of the extraordinary prevalence of this malady, but it had assumed such extensive proportions as to lead him to the conclusion that there must be some special atmospheric conditions which of themselves tended to depress the vital powers and to cause a perverted state of the functions and of nutrition, even if there was not some special causal entity such as a micro-organism. His experience in this outbreak had strongly confirmed one fact which he had previously observed, viz., that those animals who had previously suffered from lung affections, and in whose lungs there existed areas of damaged tissue, were extremely likely to suffer from rapid putrefactive disintegration of such tissue, and as a result from septicæmia; the absorption of the septic products he thought might, in some instances at least, explain the production of the purpuric lesions. He might also mention the fact that in one case the horse had suffered from an attack of purpura about eighteen months before, and at that time had made a good recovery, and further, in order to show that the causes in operation to produce the disease were not of a purely local character, he would direct their attention to the fact that the disease had appeared in large studs of horses in which it was previously absolutely unknown.

W. D. FAIRBAIRN, *Hon. Sec.*

YORKSHIRE VETERINARY MEDICAL SOCIETY.

THE following is the paper on Horse-shoeing read by Mr. Mason at the meeting of the above society, but which did not arrive in time to be inserted in the report in last month's Journal:—

Mr. PRESIDENT and GENTLEMEN,—The subject I have chosen to bring before your notice this afternoon, "Horse-shoeing and Machine-made Shoes," is an art of which individuals of every rank and grade of intelligence have their pet ideas, both as regards how a horse should be shod, and the different form of shoe to be required; in fact, so various and conflicting are the opinions expressed by those who profess to know all about this art that one wonders whether there is really any proper way of performing the operation.

I think we may start with the acknowledged fact that "shoeing" is a necessary evil; but by a careful performance of that operation this evil can be lessened to a great extent. The ancients of early times simply attached a narrow rim of iron to their horses' feet by a few rudely-shaped nails, and found that if allowed to remain the hoof became abnormally overgrown, and then the shoe required to be taken off, and the superfluous growth removed, or the animal made to travel without this narrow rim of iron until it was again needed.

Much has been written and many theories have been advanced on this subject; the most illiterate and scientific have grappled with this matter. The average growth of the entire wall of a medium-sized hoof is about twelve months. Many speak as to the advisability, for the proper preservation of the feet, to pare them at each shoeing, to thin the sole until it springs under the finger on pressure; others say on no account should the foot be touched, especially the sole and frog, the cutting of these parts producing such ailments as corns, canker, thrush, laminitis, and navicular arthritis. The toe

and heel also come in for discussion, as to whether the former be shortened and lowered, and the latter whether they are to be cut away. Some persons purposely cut down the heels with the idea that it prevents contraction, because flat feet always have low heels, and that by keeping the foot low it is a preventive for contraction; again, others, if the heels are cut away the back tendons are ruined.

The class of shoes and manner of applying are opinions just as varied. Some desire a heavy shoe to prevent concussions, others a light one to preserve elasticity. Then as to shape, the ordinary seated shoe some say is a most irrational shoe; some that instead of being concave on its inner surface it should be flat, so as to have a bearing both on wall and sole; others extol the Charlier system. The principal and great advantage of this shoe is the fact that the horse receives all the benefits of going barefoot, though he is shod.

Regarding the fitting of the shoe to the foot, we are told the shoe should never be applied hot, as it causes brittleness, by depriving the hoof of its natural moisture; others say a shoe cannot be fitted properly unless heated. The necessary number of nails required to hold the shoe in position is a debated question. Five nails is the average number, three on outer side and two inner side for any ordinary-sized foot. Clips are required at the toe, and materially keep the shoe in position. Some say they are a source of great mischief. Very often it is not the incapacity of the smith that is the cause of bad shoeing; he is so often required by the owner of the animal to be shod to perform the operation in such and such a manner, for many people have peculiar ideas regarding this operation. It is imperative that every horse-shoer should be well informed regarding the formation and structure he has to deal with in health and disease. Flat feet required to be shod in a different manner from a hollow foot, also it depends upon the kind of work the animal is required to perform.

There are very many methods of shoeing horses, each claiming special superiority; but I think no particular rule can be exclusively carried out, for a flat foot requires shoeing in a different manner to a hollow or concave foot; also it greatly depends on the kind of work the animal is required to perform. But there is one general rule to apply to every case, and that is an endeavour to preserve as far as possible the natural shape and condition of the foot. In the matter of cutting and paring the feet there is certainly far too much of it done; but I do not agree altogether that the drawing-knife be banished from every forge, and that the foot be only trimmed by the rasp. I consider the knife the most proper instrument to accomplish it with in the hands of those who are qualified to use it.

With regard to the theory that the sole never requires paring, we are told that the sole relieves itself of its waste material by natural process. Yes, so long as the foot is not encased by a shoe, and is permitted to come in contact with the ground, the consequent friction assists in the removal of superfluous horn from the sole. Certain forms of feet, flat or pumiced feet, even when shod for a considerable length of time, do not require any paring of sole, frog, or even walls; but there are forms of feet in which the growth of horn is most abundant, and when shod, even for a limited period, their partial deformity is evident, and the growth is not only confined to the wall of the hoof, but to the sole, and sometimes frog. Often on removal of the shoe an accumulation of waste horn is discovered, varying from three-quarters to half an inch in thickness, and which has no fibrous connection whatever with the true insensitive sole, and certainly serves no good in being allowed to remain; and I think for the good of the foot all such accumulation should be removed and this can be accomplished with a free use of the drawing-knife, and when the true fibrous structure of the sole is reached this process of paring should

stop. The walls also should be reduced to their natural proportions, but the healthy frog should never be touched with the knife.

The ordinary seated shoe I consider best adapted for draught-horses. Some people condemn it as a shoe which produces corns, but if this class of shoe is properly fitted and applied there is no such danger. Some argue that the shoe should in every case have a bearing alike upon sole as well as wall, but with that I cannot agree. A well-formed concave foot when in nature's state has very little connection with the ground, so far as the sole is concerned; the wall and frog are the only surfaces in immediate contact, and the foot maintains its healthy condition, and with not the least symptoms of lameness by the non-contact of the sole with the ground. In flat or pumiced feet, when the sole does really come in contact more or less with the ground, the feet, instead of being benefited, are, to a greater or lesser extent, damaged by such contact; in fact, animals with this condition of foot are actually benefited when shod, and with seated shoes, which have no bearing upon the sole. This seated shoe should always be made wide enough to cover not only the wall but also the connection between the sole and wall, and made to fit the foot and not the foot to fit the shoes; and the weight of such shoe in proportion to size of animal. Caulks to be made of equal length, and never to exceed half an inch. Very great damage is done to the feet by wearing caulks of too great length, and also of unequal length. Toe-clips, especially upon draught horseshoes, are beneficial, and to a great extent they materially assist in keeping the shoe in position upon the foot.

With regard to applying a hot shoe in fitting, I think to fit a shoe properly it is quite necessary, and if done judiciously no harm to the foot is done, and if the shoe be at a red heat an application of two or three seconds' duration is quite sufficient to mark any inequalities, and when by this means the surface of the hoof and that of the shoe are made perfectly to correspond the hot shoe to be again applied for two or three seconds, to thoroughly suit itself. This gives the shoe a far better bearing than could possibly be given to it either by the knife or rasp alone.

Having spoken of shoeing generally and of ideas which are very common even nowadays, I now pass on to special shoeing, either to prevent injuries or alleviate disease.

Cutting or Brushing, produced by defective action; cause may be defective conformation. Every farrier has an idea of stopping this cutting; but, as a rule, it is generally through idleness, weakness, or want of condition, and shoeing may have nothing to do with it. I have found, in cases of cutting, a shoe I may describe as a three-quarter-bar shoe advantageous in severe cases.

Speedy Cutting generally occurs when an animal is overpaced, or due to conformation. Use of a three-quarter shoe is often successful in such cases.

Clicking or Forging and Over-reach cause striking one or both of the front with one or both of the hind feet; or, in over-reach, by hitting heel of fore feet; may be prevented by lessening the length of the step by lowering and shortening the toes of hind feet. Concave front shoes, and shoe short. Light shoes are best.

Sandcrack and False Quarter.—In two kinds both require the same class of shoe, with no caulks. When at the toe allow no pressure upon wall on either side of the crack for quite an inch, and a clasp on each side.

If a sandcrack at quarter, a bar shoe is better, with pressure upon heel to prevent any movement when the weight of the horse is placed upon it; for if you leave a space, you will find that contact with the ground presses the horn down until it touches the shoe, and when the crack is in the quarter every such movement drags it open. But before placing the shoe on, be careful to rasp away lower edge of the wall of sandcrack for an inch each side of it, as mentioned before.

Corns.—Generally due to a bruised condition of the angle of the sensitive sole, caused by heel of shoe. Nothing so bad as a repeated bruising, for we get exostosis of angle of coffin-bone, and then always trouble of this part. Best shoe for a corn is a three-quarter shoe, or a bar-shoe in some severe cases. Care should be taken in searching or cutting corns; of course if matter exists, it is right to allow it to escape. Cutting away all the horn at the heel leaves the wall without its internal support, becoming a narrow ridge; and when weight is placed upon it it is forced inwards, causing pain and injury to inflamed structures within.

Once a corn always a corn, is the general idea; but with good shoeing the corn can be removed, and the foot acquire its original condition.

Concussion.—Nature has protected the foot against direct concussion. The hoof, with its hard wall and sole, are its chief protection, together with its elastic frog and the lateral cartilages. Sometimes some disease or injury happens, and the foot is contused. It is often necessary to guard against this concussion when no definite signs of disease are present; but only the change of action indicates to the observer that pain exists. With the milder forms of pain you get defective action; an animal going short, or not so free in action as usual. To prevent such conditions, india-rubber pads and ring-leathers are beneficial. It is often necessary to either protect a part by covering it up, or relieve it from pressure by preventing contact with the shoe.

Punctured Foot.—The horn having been removed for examination and treatment of the wound, then protection is necessary, and none better than tow and tar, and leather sole attached to the shoe.

Broken Feet.—Often the result of a lost shoe; the quarters or toe are broken away, so that any pressure causes pain. It is then necessary to relieve pressure; utilise those parts that are sound and which are generally towards the heels, making their bearing surface lengthened: you can nail well towards the heels, for the expansion of the foot upon the ground surface is so slight that no harm can take place; the expansion of the foot, as spoken of so much, taking place much higher up, viz., at the upper part of the heels between the lateral cartilages.

Convex Soles require a medium width of shoe, and must be carefully seated, so as not to cause any uneven pressure, and of sufficient thickness to prevent direct contact between the sole and the ground, and protection by a leather sole.

We so often see a shoe attached to such feet, termed generally a "saucer" shoe, a shoe which is seated from the extreme outer edge to the inner edge, so that the foot surface of the shoe presents an incline downwards to the centre; the weight of the horse forcing the foot down this incline compressing the whole of the foot, the very object in this case to avoid.

Seedy Toe.—The heels of the foot to be kept low, to avoid throwing weight forward as much as possible, and no caulkins to shoes. After the shoe is fitted remove the lower edge of the wall of the foot where affected with disease, so that a considerable space is left between the shoe and the diseased portion. As the hoof grows this space becomes less, and the shoes should not be allowed to remain on too long, for often lameness returns by the lower edge of the affected part bearing upon the shoe. The portion of the wall that is removed, singularly enough, grows faster than that which has bearing upon the shoe.

Contraction of Feet.—Any special shoeing is useless. It is possible to do without shoes in these cases; or by tips the hoof is protected by wear, and the back part of the foot allowed free play, the entire weight being thrown on the heels and frogs, increases their functional activity and promotes a healthy growth. Tips should be certainly removed once a month, or the toes will grow long and harm result.

It has been tried mechanically to expand the horse's foot by so fitting a shoe that the heels rested upon an inclined plane, exactly the opposite to the saucer shoe before mentioned, the bearing surface being inclined outwards. But this mechanical arrangement has not been attended with any marked success, only in some instances does it produce lameness.

Laminitis.—No better shoe or treatment can be more effectual than Mr. Broad's shoe, the heels of the foot to be kept low and the toe shortened. Apply a lightly nailed, extremely stout, wide-webbed and long-bar shoe; the shoe to be gradually thinned from behind the quarters to the heels, which enables the horse to throw his weight better than he can in ordinary shoes or none at all.

There are many other forms of special shoes, such as elongating the toe of the shoe for contracted tendons and ligaments, etc. But I will not weary you further upon this part of my subject, but allow me now to pass on to "machine-made shoes."

Machinery in these days has brought about so many changes, especially for trade purposes, that it is not surprising the shoeing of horses is no longer to remain altogether a handicraft: and no innovation of late years in horse-shoeing can approach in utility the present "machine-made horseshoes." Nearly the whole of our cavalry upon home service are shod with them after, I believe, most elaborate trials.

I believe the first known machine-made shoes were those of Louchaire, and made in Germany. The machine-made shoe leaves but little to be desired as regards shape, level, and nail-holes; and are sold as near-fore and hind and off-fore and hind; they are fullered, bevelled, have a level bearing, and are made in different sizes and of Swedish iron. Should machine-made shoes satisfy the demands of the art of shoeing—for it is unfortunately only too true that by far the greater number of our blacksmiths are unskilled workmen, and that properly-made shoes are exceptional, and I fear very many horses are ruined from bad shoeing, want of removes, etc.—we should obtain a better and much cheaper method; and these last factors would go far towards promoting a general introduction of these shoes. The defenders of the hand-made shoes say that every shoe must be made according to the foot, and therefore a machine-made shoe will never fit. But machine-made shoes are fitted in the same way as hand-made ones, and when good material is used alterations are easily made. It is not asserted that occasionally special shoes have not to be made for flat, full, or pumiced feet, horses that brush, or have weak or broken hoofs; but these are exceptions, and amongst the different sizes of the machine-made shoes there is choice sufficient to shoe nearly every horse properly.

The machine-made shoe has also produced the system of cold-shoeing, and is generally greatly recommended; and observations have proved that shoes may be well fitted and put on by the cold method. It is not as convenient, and it takes more time to fit a shoe cold than to burn it on, but there is no difficulty about the operation. The hoof to be reduced with the rasp, and get the bed so level that the bearing be even everywhere. A machine-made shoe must be made of the best iron, for no shoe can be put on without having its shape altered. The shoe to be fitted cold on the anvil, when it will be chiefly a question of widening or closing the shoe to the shape of the hoof. My own slight experience is confined to the machine-made shoes as devised by Dr. Fleming, Principal Veterinary Surgeon to Her Majesty's Forces, and adopted in the Army, and can be described as a concave fullered shoe, and perfectly flat upon the foot surface. The shoes are numbered in sizes from 1 to 8 for horses, and 1 to 6 for mules; and within this range they fit and suit all horses and mules with normally-shaped feet; they are applied cold, which means that a forge can be dispensed with.

I am of opinion that there is a great future in store for the machine-made shoes, and their economy and efficacy and application without the aid of a forge must in time cause them to be generally adopted, especially when they have become more perfected. Very many large companies have them in use in England, and there appears to be an increased demand for them both at home and abroad—a fact that goes far to prove their suitability.

Their introduction into the Army can only be fully understood and appreciated (I speak now as a late officer in the Army Veterinary Department) by those who have experienced the difficulty of keeping horses shod properly on field service. I now conclude with a mechanical arrangement, viz. the "nailless horseshoe," an invention that is attracting some attention, and which is said to be able to be applied to a horse's foot by anyone, who need not be an expert.

The nailless horseshoe is shaped like the ordinary shoe, but instead of being attached to the hoof by nails it is held in position by a band of steel, which passes in front of the hoof well below the coronet, and by three studs, two of which are set at opposite angles on each side of the toe, while the third is fixed immediately behind a pillar of steel, which rises in front of the shoe for the purpose of retaining the band in its place.

To fix this shoe it is necessary to raise the horse's foot, place the shoe in position, pass the band round the front of the hoof, and slip the loop in the centre of the band inside the prong, which is attached to the front pillars for that purpose. The shoe thus fixed is prevented from shifting either backwards or forwards by the shoe stud, and the band already mentioned and the front pillars; and the band passed round it effectually prevents the shoe from dropping off.

In conclusion, I may say that I wrote to the makers of the nailless shoes, telling them I was reading a paper on the subject of shoeing before this Association, and was wishful to bring a shoe before the meeting. They replied that they had no models, and I asked them to send a shoe and I would make my own models, but they replied they preferred to make their own models.

LONDON PATHOLOGICAL SOCIETY.

Multiple Symmetrical Tumours of Bones from a Dog.

At the meeting of this Society on May 21st, Mr. W. G. Spencer showed drawings and photographs of, and the bones of the fore and hind limbs from, a collie dog which had come under his notice at the Brown Institution. They showed the following points: 1, symmetry both on the fore and hind limbs; 2, that the tumours had advanced from the extremities as far up the fore limbs as the hind limbs; 3, that the progress had consisted in the growth of separate tumours from the bone, which had fused with one another into lobular masses; 4, that the tumours commenced on the dorsum of the fore and hind feet, and extended upwards; tumours in an early stage were seen in the lower part of the femur and humerus, which apparently commenced in the bone below the outer layer; they were parosteal rather than periosteal in origin. The dog was a fine valuable collie, aged four years, which had been well cared for, and with no history of any accident. The disease had been noticed twelve months before, as small tumours on the dorsum of the feet, which had grown considerably during the last six months. The tumours felt extremely hard; they caused no pain except towards the last, when slight tenderness was present over them. The dog became very fat in confinement. It was killed, and no further pathological lesions were found, except a scar on the lung, apparently from a parenchymatous rupture. On the limbs, the skin and subcutaneous tissue, including the under surface of the feet, were normal. On the dorsum of each foot there was a mass of the growth; another surrounded the tibio-fibula and radio-ulna. The

femora and humeri showed slight protuberances of the bone, but there were no changes in the soft parts which covered them. The tumours were not circumscribed; they had involved the muscles, and the tendons ran through and into them in grooves. Fibrous extensions of the growths surrounded the tendon sheaths beyond the limits of the tumours. The tumours were fibrous on section, and a little below the surface the knife arrived at extremely hard bone, which formed the base. Microscopically the structure was that of a fibro-myoma.

Dr. PAYNE thought the tumours were similar to those of multiple exostoses occasionally found in human beings.

Mr. BOWLBY thought the thickenings were probably of a purely inflammatory nature.

ROYAL AGRICULTURAL SOCIETY.

AT the June monthly Council meeting Sir John Thorold presented the following report:—

"*Pleuro-pneumonia.*—Between April 20th and May 25th (a period of five weeks) thirty-three fresh outbreaks of this disease have been reported in Great Britain, and eighty-two cattle found affected with it. In the corresponding period of last year there were fifty fresh outbreaks and 144 cattle attacked. In Ireland, fifteen outbreaks have occurred in the five weeks, and thirty-four cattle have been attacked, whereas in the corresponding weeks of last year there were twenty-four outbreaks and sixty cattle affected. The healthy cattle slaughtered because they had been in contact with the disease numbered 767 in Great Britain, and 187 in Ireland.

"*Anthrax.*—During the five weeks above mentioned there have been twenty-four fresh outbreaks of Anthrax in Great Britain, twenty-two of them in England, and two in Scotland: seventy-four animals were attacked, two of which were in Scotland, the rest in England; no less than forty-two of these cases were reported in one week in the county of Dorset, the affected animals being pigs. The other counties from which Anthrax returns have been received were Cornwall, Kent, Lancaster, Leicester, Northampton, Notts, Oxford, Somerset, and the Isle of Ely, in England; while in Scotland the disease existed in Forfar and Edinburgh.

"*Swine Fever.*—For the past few weeks this disease has been increasing, but not to any greater extent than usually occurs about this season of the year. In the five weeks ending May 25th there were 585 outbreaks reported, or an average of 117 per week; in the preceding sixteen weeks of this year the average was about seventy-eight per week. The number of pigs attacked was 2,811; of these, and about 300 left alive diseased from previous weeks, only 1,310 were killed, 1,061 died, 146 recovered, and 516 remained alive when the last return was made up."

A letter had been received from the Agricultural Department announcing that the Lords of the Committee of Council for Agriculture had suspended the operation of the Order of the 1st March, admitting animals free from Holland, until the first September next. Thirty-nine entries had been received for the horse-shoeing competition, six of which were for the exhibition of systems not in common use. A letter had been received from Mr. B. Freer, of Uppingham, accepting the appointment of Provincial Veterinary Surgeon for the county of Rutland.

The following report had been received from Mr. H. Crofts, the Society's Provincial Veterinary Surgeon for Bedfordshire:—

"In presenting my bi-annual report I have no very serious cases to bring before you. In the month of January last I had two cases of Anthrax, and at the same time also four separate outbreaks of Pneumonia in horses upon four separate farm premises.

"In the outbreak of Anthrax remedial measures proved most effective in arresting any further outbreak. In the cases of Pneumonia little could be effected in preventing the extension of the disease to the other horses upon the same premises, though contagion was not suspected. In all the total number of horses attacked was forty. The effect of medicine in arresting the progress of the disease was most satisfactory; not more than two of the thirty cases fell victims from the disease, whereas before the application of medicine three horses died, having received no medical aid. These were seen upon my first visit to each of three farmsteads, and found in a hopeless condition, the lungs being choked with a lymphy deposit. The primary cause of each of these outbreaks was the extremely cold and damp weather, acting upon premises low-lying and badly drained, and all upon a clay subsoil. At the same time, and on the same farms, horses and cattle remaining out in the fields and not housed escaped the disease in every case.

"(Signed) H. CROFTS, M.R.C.V.S."

GLASGOW VETERINARY COLLEGE.

THE winter session of this institution terminated on the 17th May, and on the 21st, 22nd, and 29th the examinations of the Royal College of Veterinary Surgeons were conducted within the museum of the college, the results of which are announced in another part of the Journal.

Medals granted by the Highland and Agricultural Society of Scotland; the late Professor Allan Thomson, of London; Mr. Thomas Campbell, F.R.C.V.S., Kirkcudbright; and Principal M'Call, and certificates of merit by the college, were awarded in the different branches of study as follows:—

Horse pathology (written examination).—Silver medal (H. and A. S. of S.), Mr. James Gregg; first-class certificates, Messrs. David Warnock, J. W. Peatt, and J. M. Graham; second-class certificates, M. Wilson, J. M. M'Dougall, and W. M. Hutchinson.

Cattle pathology (written examination).—Silver medal (H. and A. S. of S.), Mr. David Warnock; first-class certificates, Messrs. Gregg, Graham, and Peatt; second-class certificates, Messrs. Wilson and J. R. O'Reali.

Morbid anatomy (written examination).—First-class certificates, Messrs. Warnock, Gregg, and Hutchinson; second-class certificates, Messrs. M'Dougall, Wilson, and Peatt.

Practical examination of horses as to age, soundness, operations, etc.—Gold medal (Principal M'Call), Mr. M. Wilson.

Practical examination of cattle and sheep as to soundness, age, operations, etc.—Gold medal (Mr. Campbell), Mr. David Warnock.

Anatomy, special and comparative.—Medallist, Mr. J. K. Bruce; first-class certificates, Messrs. W. Davidson, A. Renfrew, and T. A. Trotter; second-class certificates, Messrs. W. Logan, G. Waddell, and J. Kirk.

Physiology (written examination).—Medallist, Mr. T. A. Trotter; first-class certificates, Messrs. J. K. Bruce, W. Davidson, A. Renfrew, and G. Waddell; second-class certificates, Messrs. J. Thompson, A. Millar, and C. A. Squair.

Best professional examination in anatomy.—Gold medal (the late Professor Allan Thomson), Mr. T. A. Trotter.

Junior anatomy.—Medallist, Mr. J. A. Gilruth; first-class certificates, Messrs. J. Forrest, S. C. Pottie, W. Marshall, and J. A. Jordan; second-class certificates, Messrs. R. Mason, J. D. Walker, and H. Hazeel.

Chemistry.—Medallist, Mr. J. Forrest; first-class certificates, Messrs. J. A. Gilruth, J. D. Walker, J. E. Johnston, W. Marshall, and W. Galloway; second-class certificates, Messrs. J. Douglas, R. Mason, and S. C. Pottie.

Botany.—Medallist, Mr. J. A. Gilruth; first-class certificates, Messrs. J. D. Walker, J. E. Johnston, J. Forrest, and J. Douglas; second-class certificates, Messrs. J. W. Neill and W. Galloway.

Principal M'Call's bursary of £20, or a gold medal the value of that amount, for the student who obtained the highest aggregate marks in his first and second professional examinations before the Board of Examiners, was divided between Messrs. J. K. Bruce and W. Logan, their marks being equal.

NEW VETERINARY COLLEGE, EDINBURGH.

THE examinations of the students of this school, by the examining board of the Royal College of Veterinary Surgeons, took place towards the end of May, with the results recorded elsewhere in the present number of the Journal, and the distribution of prizes to those of the students who had been successful took place on the 21st of that month, Professor Williams, Principal, presiding. The following is the prize list :—

The Principal's £20 Prize.—Gold medal, T. G. Duggle.

Horse Pathology.—Medal, F. Booth; first-class certificates, W. Stothert, J. Robertson; second-class certificates, T. M. Parker, E. F. de Jong, R. W. Davidson.

Cattle Pathology.—Medal, J. Robertson; first-class certificates, E. F. de Jong, T. G. Duggle; second-class certificates, W. Stothert, T. M. Parker, J. P. Isherwood, F. Booth.

Anatomy (Senior).—Medal, J. H. Parker; certificates, J. Brand, W. S. Lamont, Cockburn, L. Browne.

Physiology.—Medal, J. H. Parker; certificates, W. S. Lamont, R. J. Bushwell, J. Cockburn, E. Farn.

Histology.—Medal, R. J. Bushnell; certificates, J. H. Parker, E. Farn, J. Brand, W. S. Lamont, A. McGregor.

Chemistry.—Medals, Todd and Johnstone.

Practical Chemistry.—Medals, E. Haywood and A. G. Todd.

Elementary Anatomy.—Medal, R. E. Johnstone; certificates, R. Eagleshan, C. Haywood.

Botany.—Medal, J. Connochie; certificates, C. Haywood, R. E. Johnstone, J. Farmer, J. H. Diddle.

Curators of Museum.—Medals, E. Franklin and E. F. de Jong.

For Practice.—Medals, W. Stothert, E. K. Burton.

Demonstrator of Pathology.—Medal, J. Robertson.

Agricultural : Veterinary Hygiene.—Principal's class: Medal, J. J. Jeffray. Professor W. O. Williams's class: Medal, D. J. Gilchrist.

Army Veterinary Department.

Gazette, June 11th.

Veterinary-Surgeon George Richard Griffith has been seconded for service with the Egyptian Army. Dated 27th May.

The undermentioned Veterinary Surgeons on probation to be Veterinary Surgeons (ranking as Lieutenants). Dated 28th November, 1888 :—

Thomas E. W. Lewis.
Eugene W. Larnder.

Augustus Charles Newson, gent., to be Veterinary Surgeon on probation, vice Veterinary Surgeon G. R. Griffith, seconded. Dated 12th June.

The Annual Dinner of the Department was held in the Hotel Metropole, on June 21st. Principal Veterinary Surgeon Dr. Fleming, C.B., was in the chair, and there were present Inspecting Veterinary Surgeons Lambert, Walters, Steel (retired), Veterinary Surgeons F. Walker, W. Pallin (retired), Marshall (retired), Thomson, Duck, Poyser, J. W. Evans, Oliver, Ringe, Burton, Longhurst, Edwards, Short, Glover, Kettle, D. C. Pallin, Lewis,

Savage, Killick, Finlayson, Fenton, F. Smith, Whitfield, Morgan, Jones, Matthews, Philips, F. Raymond, A. F. Appleton, Bennett, Haslam, Newsom.

Veterinary Surgeon A. G. Lawson has arrived in England on sick leave, having suffered from a very severe attack of Smallpox, the infection of which was received while he was serving in Burma.

Mr. E. E. Bennett acted as a judge of horse-shoeing for four days at the Royal Agricultural Society's show at Windsor.

Obituary.

The following deaths of Members of the Royal College have been reported:—

J. B. Jones, Ludlow, Salop,	who graduated	in	1837.
G. Harrison, Stafford	"	"	1842.
H. R. Bradshaw, Dublin	"	"	1874.
P. B. Ferguson, Manchester	"	"	1843.
J. Symes, Wincanton	"	"	1869.

Notes and News.

Docking Horses in the United States of America.—The following are the terms of an Act recently proposed in the Massachusetts Legislature by Geo. T. Angell, President of the State Society for the Prevention of Cruelty to Animals:—"Section 1. Whoever shall mutilate any horse by cutting the solid parts of the tail in the operations known as docking or pricking, and whoever shall cause the same to be done or assist in doing the same, unless the same shall be clearly proved to be a benefit to the horse, shall be punished by imprisonment in gaol not exceeding one year, or by fine of not less than one hundred dollars, and not exceeding two hundred and fifty dollars, and fines collected upon, or resulting from the complaint or information of an officer or agent of the Massachusetts Society for the Prevention of Cruelty to Animals, shall be paid over to said Society in aid of the benevolent objects for which it was incorporated."

Hydrophobia in Paris.—Dr. Dujardin-Beaumetz, Director of the Hospital Cochin, has presented to the Board of Health of the Department of the Seine his yearly report upon cases of Hydrophobia occurring in the department. In the year 1888, nineteen persons died of this disease, which is a greater number than for many years past, save in 1881 and 1886. Of the deaths in 1888, three were due to bites of cats and sixteen to bites of dogs. In two cases there was no bite at all, the virus being conveyed by the tongue of the animal in licking. The period of incubation of the disease in the nineteen cases varied from twenty-five to forty days. It appears that the diagnosis of Rabies is not so simple a matter as is commonly supposed. In four cases diagnosed the doctors went entirely wrong. In one case the disease was found to be Tetanus, in three others Angina, Diabetes, and Delirium Tremens. The concluding portions of M. Dujardin-Beaumetz's report is devoted to a consideration of the treatment of Rabies by the Pasteur method. In 1887 there were 306 persons reported in Paris as bitten. The madness of the biting animal was demonstrated in 263 cases. Out of the total of 306 cases only three were fatal, which put the mortality at .97 for each 100 if all the cases are taken, or at 1.14 for each 100 if only the cases in which the biting animal was surely mad are taken. The above 306 cases were treated by Pasteur's method. There were also reported during the same year 47 cases of persons bitten who did not receive treatment by inoculation. Out of these seven died. The figures for 1888 tell almost exactly the same story. Only four persons out of 385 treated by the Pasteur method died.

Shameful Torture of Pigs.—Calcutta's newest institution is a swine-torturing yard, where some low-caste natives indulge in the most fiendish practices. For instance, writes a correspondent of the *Homeward Mail*, "a huge fire is lighted, and a live pig, with its feet tied together, is thrown into it to be roasted alive; or the poor beast is tied up by its four legs to as many posts in an open space, and about half-a-dozen men, with red-hot spears, fly at it, poking at the sides, and thrusting the weapons into its eyes, nostrils, and mouth (the spears being reheated now and then at a fire kept burning for the purpose close by), till the animal is tortured to death."

Rabies in the United Kingdom.—In Great Britain, during the first seven weeks of the last quarter, 35 cases of Rabies have been reported, all of them in dogs; they have been distributed as follows:—Cheshire 1, Kent 8, Lancashire 2, London 8, Middlesex 5, Notts 1, Oxford 1, Surrey 2, and York (West Riding) 7. It will be seen from these figures that the disease is most prevalent in and around London. In Ireland during the seven weeks above mentioned 87 cases of Rabies have been reported, 30 in Ulster, 28 in Munster, 24 in Leinster, and 5 in Connaught. The animals affected were 39 dogs, 16 cattle, 23 sheep, 5 goats, 2 swine, 1 horse, and 1 donkey.

A Remarkable Old Mare.—Professor Degive, of the Brussels Veterinary School, describes a mare at Hainaut, which is thirty-eight years of age, and which is in good health, does a fair amount of work, and still masticates her oats well. Last February, when Degive saw her, she was very sound and moved freely. She was then in foal, had produced a foal last year, and the owner asserted that she must have brought forth at least thirty foals. He had owned her since she was three years old.

Protracted Incubation of Rabies.—In April, 1887, a Russian peasant named Orgijewsky, of Bendera, was bitten by a rabid wolf, and sent to the bacteriological laboratory at Odessa, where he was inoculated after Pasteur's method. Nineteen months after he became affected with Hydrophobia, and died.

Hydrophobia in Bavaria.—From 1863 to 1876 from fourteen to thirty-one persons died each year in Bavaria from the bites of mad dogs. A striking contrast to this is presented by the experience of the last seven years, during which period only three deaths from Hydrophobia have occurred in a population of five and a half millions. This result is attributed to the strict enforcement of the regulation that every dog is at once killed who is found without a collar with a mark signifying that the tax on the animal for the current year has been paid. By this means stray curs without owners are easily eliminated.

Correspondence.

FAIR REPORTING.

Sir,—I hope the Journal will report *verbatim* what Sir Frederick Fitzwygram said with regard to Mr. Kidd's attempt at the last Council meeting of the R.C.V.S. to have the minutes of the previous meeting read. I see that Mr. Hunting's paper makes no mention whatever of the rebuke administered. Had it been administered to any member holding the "dual appointment," the paper in question would have given prominence to it, and its readers would have been favoured with a leading article on the subject. Mr. Kidd has been sent to the Council with a special authority, and no doubt means to "put things right." His first attempt was somewhat disastrous.

June 10th. "Chondrin."

VERY DESIRABLE.

Sir,—Cannot something be done to facilitate business at the annual meetings of the Royal College of Veterinary Surgeons? The meeting is announced for 12 o'clock, but really there is nothing done until an hour afterwards, and

then time is wasted and the great majority present disgusted by having to listen to nonsense talked by some men who like to hear themselves talk, or individuals on the back seats who are allowed to bawl and brawl to their heart's content, happy only when abusive. Time with me and many others is of some consequence, and I must confess that the hours expended in the unedifying occupation of listening to such persons who have no claim whatever to such indulgence, but rather the contrary, can be badly spared. The annual meeting for the last two or three years has been made in the highest degree unsatisfactory by the rowdy element in the profession, and I hope, sir, that steps will be taken to render its proceedings more orderly and respectable by suppressing that element.

June 2nd. "BUSY PRACTITIONER."

NATIONAL VETERINARY ASSOCIATION.

DEAR SIR,—May we trouble you to kindly announce to your readers, that the Seventh General Meeting of the National Veterinary Association will be held on July 24th and 25th, 1889, at the Society of Arts Rooms, John Street, Adelphi, London.

The following subjects will be brought forward for discussion:—

1. Cow-Pox. By Professor E. Crookshank.
2. Diseases of the Urinary and Generative Organs. By Mr. A. E. Macgillivray.
3. Some Contagious Skin Diseases of the Horse. By Prof. W. A. Edgar.
4. Mechanical Aids to Diagnosis. By Mr. W. Hunting.

Members of the Profession (not members of the Association) are invited to attend the meeting as visitors, and join in the discussion, if they will forward their names and addresses to the *General* Secretary, when a card of admission will be remitted to them.

SIDNEY VILLAR, *Hon. Local Secretary.*
GEORGE A. BANHAM, *Hon. General Secretary,*
Downing Street, Cambridge.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from A. Peters, Boston, U.S.A.; Professor McCall, Glasgow; R. W. Burke, A.V.D., Athlone; J. Malcolm, Birmingham; R. Rutherford, Edinburgh; J. C. Berne, A.V.D., Portsmouth; Prof. Williams, Edinburgh; A. W. Hill, London; S. Villar, Harrow; T. B. Goodall, Christchurch; Dr. Duncan, Toronto; P. R. Gordon, Queensland; "Chondrin;" "Busy Practitioner."

BOOKS AND PAMPHLETS: *A. Koch*, Encyklopädie der Gesammten Thierheilkunde und Thierzucht (Band V., VI.); *Dr. R. A. Smith*, The Physiology of the Domestic Animals; *Drs. F. Boschetti and R. Bassi*, Fleming's Trattato di Ostetricia Veterinaria (3a dispensa); Journal of the Royal United Service Institution; *J. Csokor*, Lehrbuch der Gerichtlichen Thierheilkunde; Le Cidre et le Poiré; Bulletin et Memoires de la Société Centrale de Médecine Veterinaire; *H. Moller*, Lehrbuch der Augenheilkunde für Thierarzte; Bulletin des Séances de la Société Nationale d'Agriculture de France.

JOURNALS, ETC.: *Deutsche Zeitschrift für Thiermedicin und Vergleichende Pathologie; Recueil de Méd. Vétérinaire; American Veterinary Review; Annals de Méd. Vétérinaire; La Clinica Veterinaria; L'Echo Vétérinaire; Wochenschrift für Thierheilkunde und Viehzucht; Der Hufschmied; Journal of Medicine and Dosimetric Therapeutics; Revue Vétérinaire; American Live Stock Journal; Der Thierarzt; Mark Lane Express; London Medical Record; Medical Press and Circular; Edinburgh Medical Journal; Lancet; British Medical Journal; Journal de Med. Vétérinaire; Live Stock Journal; Bell's Weekly Messenger; Quarterly Journal of Veterinary Science in India.*

NEWSPAPERS: *Glasgow Herald; Scottish Leader; Irish Times; Guardian; East Anglian Daily Times; Manchester Courier; Brisbane Courier.*

THE VETERINARY JOURNAL

AND

Annals of Comparative Pathology.

AUGUST, 1889.

PURPURA HÆMORRHAGICA, WITH PROTRUSION OF EYEBALLS, IN A HORSE.

BY F. WALKER, M.R.C.V.S., FIRST LIFE GUARDS.

TROOP-HORSE D. 22, aged nine years, was admitted to hospital on the afternoon of May 29th, with swellings of different sizes on various parts of the body. The most prominent of these was one extending from the sternum as far as the sheath of the penis. These enlargements were of an indurated nature. The horse had been at work in the morning, and appeared to be in his usual health. At three o'clock, when being led out to the water-trough, it was noticed that he did not move freely, and the man at once brought him to hospital.

The enlargements were well fomented, and Oleum Tereb. *c.* Oleum Lini. administered. At evening stable hour, 6 p.m., I observed that both hind legs were tumefied. These were swathed in woollen bandages, and a draught composed of Eth. Sulph. *c.* Ferri Iod. given. The appetite continued good, and I considered this case to be one of ordinary Anasarca.

At 6 a.m. on the morning of the 30th it was reported to me that the patient was much worse, and I found him with the head and neck enormously enlarged, especially the face and lips, which bore a strong resemblance to those of the hippopotamus. The enlargements about the body had also increased in size. Upon examination, I found the inside of the lips of a dark purple hue and the eyes bloodshot. Serum exuded from the skin covering the swellings, showing that I had now a case of Purpura Hæmorrhagica in its worst form to deal with. Stimulants and tonics were freely administered. The appetite was never wholly lost, but there was great difficulty in mastication, though oatmeal gruel was swallowed easily and with avidity.

About 9 a.m. on the third day after admission, the eye on the right side was observed to be slightly protruding. With constant fomentation this protrusion was somewhat reduced, but in the afternoon of the same day the left eye became congested, and in a very short space of time to an alarming extent. Local remedies, with scarification of the conjunctiva, were applied, but without benefit. As this case was unique and the only one of the kind I had ever seen, I had photographs of the animal taken, showing the state of body and protrusion of the eye on the left side. These I forwarded to Dr. Fleming, C.B., the Principal Veterinary Surgeon to the Forces.

I imagine that the congestion and protrusion of the eyeball were caused by embolism of the vessels supplying the eye with blood. On the 4th June, the animal being semi-comatose, and considering it a hopeless case, I had him destroyed.

Autopsy immediately after death. Abdominal cavity: organs healthy, with the exception of the liver, which was slightly hepatised.

Thoracic cavity: organs healthy.

The cellular tissue, wherever any enlargement existed, was distended with serum, mixed with blood.

I was unfortunate in endeavouring to extract the eyeball in its entirety, thus losing the chance of discovering the cause of the congestion and protrusion.

SOUTH AFRICAN HORSE SICKNESS.

BY J. A. NUNN, F.R.C.V.S., A.V.D., BARRACKPORE, INDIA.

In a report on this disease which was published in the Veterinary Journal of January, 1888, I pointed out that although Horse Sickness was at one time very prevalent in the Cape Colony, extending even as far south as Cape Agulhas, of late years it has entirely disappeared from these parts; and I endeavoured to show that, it being a malarial fever, the reason it is no longer observed in the south of the Colony is that the features of the country have altered. This alteration, I pointed out, was, in my opinion, due to the introduction of the merino sheep, which have eaten down the herbage under the karoo bush, thus changing the character of the "veldt," and covering the face of the country with a series of surface drains by the sheep walks they made. All these facts were reasons, "amongst many others," that I advanced to show that South African Horse Sickness was a very remarkable type of malarial fever, and not "Anthrax," as was commonly supposed. That the character of the South African "veldt" changes

under cultivation, I find has been noticed by others—amongst them Mr. F. C. Selous, the great South African hunter. In an article in the *Fortnightly Review* for May 1st, 1889, on "Mashunaland and the Mashunas," he says, "When the Boers first occupied the Marico district of the Transvaal, which in its general features is very like the slopes of Mashunaland, they suffered much from malarial fever; but as the land was gradually brought under cultivation the fever steadily decreased, and now the country is considered eminently healthy."

AN UNUSUAL CASE OF LAMENESS.

BY F. DUCK, A.V.D., ARMY REMOUNT DEPOT, WOOLWICH.

A WELL-BRED, powerful hunter, while being ridden with the drag, was jumped from a grass field over a hedge into a road lower than the field, and was then found to be dead lame with almost complete loss of power of the off hind leg. The horse was taken home quietly and slowly, and presented the following symptoms when I saw the case some two hours afterwards.

Symptoms.—Horse in pain, uneasy and anxious, sweating in patches. When excited to move, there was complete inability to flex and advance the off hind leg, the gastrocnemii tendons became relaxed, showing a deep "kink" about three inches above the hock.

An ambulance was obtained, and the patient, being assisted by a rope passed round the foot to draw the leg forward, was with a little difficulty removed to the sick lines and placed in slings.

Previous History of Patient.—It should be stated that the horse had previously been unlucky in that leg. There was flattening over the tuberosity of the ischium, chronic enlargement at the antero-inferior portion of hock, with considerable thickening of the fetlock and pastern.

Next morning the leg was found hanging loose and in a backward position; when the affected limb was raised the foot and pastern swung loosely from side to side, but when it was drawn a little in advance relief was given, and the horse rested his full weight on the limb. Any effort of his own accord to advance the leg only resulted in the slackening of the tendons and the appearance of the "kink" previously mentioned, with slight throwing outwards of the toe.

Beyond the chronic enlargements, there was no swelling or heat; but it was observed that, when the feet were evenly placed and the horse standing square, there was flattening of the inside of the

leg from the hock to the stifle, with a wrinkled appearance of the skin.

Diagnosis.—Mr. Digby Whitfield, A.V.D., kindly saw the case with me, and we formed the opinion, from the symptoms presented, that there was laceration, if not rupture, of the flexor metatarsi.

Treatment consisted in keeping the patient quiet in slings, and assisting nature's restorative powers. After some observation, it was found that the position giving most relief was when the foot was placed evenly on the ground, about two inches in advance of its fellow. Accordingly, by means of a side line, the leg was secured in that position. After a time this caused chafing of the heel; a patten shoe was then put on, and the line fastened round the foot.

On the 10th April, the horse, frightened by a troublesome patient in the next box, commenced plunging violently and slipped up. I was apprehensive that serious harm would result; however, it only appeared to act as a beneficial stimulus, as the subsequent recovery was more rapid. On the 10th May the patient was taken out of slings and turned loose in a large pound, and on the 9th of June was discharged. He is now being regularly exercised under saddle, and walks and trots level and true.

REPORT ON AN OUTBREAK OF "ANTHRAX" AT MHOW, CENTRAL INDIA, AMONG THE HORSES OF THE CARABINEERS.

BY J. A. MEREDITH, A.V.D., MHOW, CENTRAL INDIA.

General character of Mhow. Position.—Mhow is a military station of Central India, situated upon the edge of the Vindhya Ghats, about 1,900 feet above the sea level, latitude 22·33, longitude 75·46, and about 12 miles from Indore.

Aspect.—The general appearance of Mhow is somewhat similar to the Deccan country, but presents very characteristic conical or flat-shaped hills in almost every direction from the cantonment; so, although situated upon the top of the ghats, it is practically encircled by hills on every side. A number of main roads communicate with Mhow, but a great many are only suitable for pack-animals.

Railway.—The Rajputana-Malwa State Railway passes through the station, connecting Ajmere with Khandwa on the Great Indian Peninsula Railway. Neemuch is situated some 150 miles from Mhow.

Climate.—The climate of Mhow is one of extreme mildness, never exhibiting extremes of heat or cold, and the past hot

season, I am informed, was very similar to the ones of late years. The rains generally commence about the middle of June, but sometimes a slight rainfall is experienced in May; so the hot weather is of short duration. Mhow certainly can boast of always having a strong breeze in the hot weather; at the same time it is never very distressing, being dry and never accompanied with dust-storms.

Tatties work remarkably well during the hot season, and punkhas are hardly needed. The rains are spread over a number of weeks, and often last well into October, after which the cold weather is supposed to set in and continue until March. The station of Mhow is adjoining the Holkar State, and takes its name from a small village outside cantonments and upon the edge of the Gumbheer River, which becomes more or less dry during the non-rainy season; the station is an exceedingly widespread one and unconnected, being $3\frac{1}{2}$ miles long by $2\frac{1}{2}$ miles wide.

The surrounding country contains large stretches of black cotton soil, whilst the well-known mhorrum exists in other directions; it is one of the most dangerous and trappy districts to ride over that could be found, being full of holes which are, at this season of the year, more or less hidden and cannot be easily seen. The depth of the black cotton soils varies much, being from 2 feet to 7 feet deep; besides this danger from the holes in the cotton soils, there is another great difficulty to contend with, viz., the immense quantity of loose stones on all mhorrum grounds: thus between these two forms of soils, great danger is entailed in carrying out any cavalry manœuvres. Little vegetation exists upon the higher ridges, and the country presents a bare aspect. Where cotton soil exists, of course strong cultivation is always carried on.

Sanitary character.—Mhow is an extremely healthy and popular station for all the year round, except during the rains, when malarial fevers are prevalent; but this can be said of almost every station in India.

Epidemics have occurred of late years among the troops, and this last season Small-pox prevailed, whilst just at the present time the hospitals are full of mild cases of fever. During the season preceding the rains, Foot-and-Mouth disease was raging over all the district, including Mhow Bazar, a place where a great number of milking cattle are kept for the purpose of supplying milk to the cantonment; the disease also appeared in 4-1st (Heavy), Welsh Division, Royal Artillery,—27 cases in all; but with strict segregation and constant inspection of the bazar cattle, I was able to prevent it increasing as rapidly as it would have done had I not kept all cases up and been assisted with police supervision. During my rounds in the gowlie's (milkmen's)

settlements, I saw subjects of Small-pox in all its stages freely intermixing and working with the people who daily brought milk into cantonments for sale. One cannot help but confess that the disease must spread in this manner.

After this had passed away a sudden and more fatal change arose among the cattle; they became ill in almost every village, dying rapidly after showing only a few days' illness; and from careful personal inspection, and all information I can gather upon the subject, I have come to the conclusion that Anthrax was the cause of so many deaths. I need not mention that no sanitary measures were adopted to dispose of the dead animals in the villages, but they were allowed to decay and be devoured by wild animals, and I cannot ascribe this outbreak among the cattle to any particular cause. The prevailing winds are—hot season and rains—west and south-west. I shall have occasion to refer to this outbreak of Anthrax among the cattle in my remarks on the cause of the outbreak in the Carabineers.

Temperature.—The following table will show the mean temperature of Mhow:—

January....	66·3	May	86·9	September ..	76·2	Annual mean, 6·70
February ..	71·2	June	79·7	October	77·0	
March	77·7	July	77·1	November ..	71·0	
April	85·1	August ...	75·7	December ..	67·9	

Rainfall.—The average rainfall is about 31 inches, and up to present date it is registered at the station hospital as 18 inches.

Camping-grounds.—The camping-grounds are along the bed of the Gumbheer Nullah. Mhow is scantily wooded, and the trees rarely attain any great size. At the north side of the camp, cultivation is carried on to a fair extent, and the grass-cutters have free access to obtain hariala or green grass from any district they elect to proceed to. The usual crops are grown upon the black cotton soils.

Short history of previous outbreaks of Anthrax of late years.—"Loodiana fever" occurred in 1883 in F Troop, 17th Lancers, on August 14th. One horse died on the 14th instant, another on the 15th instant, whilst another case proved fatal on the 16th August, 1883. Two more cases were admitted suffering from "Loodiana fever" on the 27th August, but these were from A Troop. One horse died at 4 a.m. on the 29th August; the other case did not prove fatal. The two troops were picketed out upon the race-course, but much nearer to the regimental hay-ricks and stables than the present encampment. Glanders was prevalent in 1884 and 1885, but no cases have been recorded since. The disease appeared among the troop horses and grass-cutters' ponies, a number of which were destroyed. This was the period during

which the late Veterinary Surgeon Twiss, Army Veterinary Department, was in veterinary charge, and active in suppressing Glanders. The other outbreaks of former years I cannot offer with official records from the veterinary hospital books; consequently I put them forward as information gleaned from some of the older employed Native establishments, who have remained in Mhow from one regiment to another. One muccudam "Samboo," with 38 years' service, 30 of which have been spent in Mhow, informs me that he well remembers some horses "dying with big throats," and, as he expresses it, from "Loodiana," when the 3rd Hussars were in Mhow, and during this outbreak he informs me the horses were picketed out behind the barracks for five weeks. Of course he has a better recollection of the outbreak in 1883, and is most correct as to the number and manner of disposal of the dead and place of burial.

He also informed me that in 1883 the sheep and goats in the various villages round Mhow died in hundreds after a short illness.

History of stables.—The stables now in use for the horses of the "Carabiniers" were originally built for barracks in 1830, and are very much after the French style. They consist of six stables numbered, respectively, 13, 14, 15, 16, 17, and 18, with outside standings next to each, whilst a greater space is left in the centre stables for the purpose of forming a double standing outside.

I am informed that in 1867 the horses were turned out of these stables, and a regiment of infantry located in the stables for some period. The present new barracks were completed about 1868. From the above register of buildings the composition and various dimensions can be seen. The cubic space allowed per horse amounts to 1,512, the square space for one horse being 112, whereas each in the new cavalry barrack gets over 1,750 cubic feet allowed; but a greater difference will be observed upon looking at the plans of the Royal Horse Artillery stables; a space for twenty horses contains the following:—

Cubic space for one horse	2,315
Square ditto	147

Upon looking at these figures, one is at once struck by the vast improvement now offered in construction of recent Government stables.

The European cavalry stables are extremely low, with the exception of stables Nos. 16 and 18 in the attached plan, which have corrugated roofs (iron). A great and appreciable difference is experienced by remaining a short period in each, for in the corrugated iron roofed stable a strong current is felt, whereas it is limited

in the others. I now refer to a time when the sun was not strong enough to affect the iron roof, and I find at this time the temperature only shows a slight variation. Each horse, when in his standing, has an archway in front of him and behind without doors, except jhamps at either end of the centre avenue.

The walls vary in construction. The floors are all made of one material, viz., "mhorrum," an excellent material, full of binding properties, which does not allow urine to percolate to any depth, and when dressed over with the usual dung-dressing, nothing could look cleaner and better. This condition was observed by the Inspecting Veterinary Surgeon, Bombay, during his visit in the outbreak. The corrugated iron-roofed stables have so far escaped the outbreak, although it raged most in Troop B, stable No. 17, a stable situated between the two iron-roofed stables.

Ventilation.—The plan of ventilation will be seen from hte attached plans.

Outside standings.—The outside standings are constructed of a similar material to the floors of the stables, but a layer of stones is deposited on each standing to keep them from being so easily worn out ; these are repaired by the syces.

Drainage.—The drainage is purely surface drainage.

Manure-pits.—The manure-pits are established at various situations around the lines, where the litter is collected and removed by a contractor, who sells it to the cultivators around the camp.

Grooming and clothing have been conducted on the service system.

Bedding consists of refused hay with the additional bedding allowance.

Selection of Anthrax Camp.—This was the race-course, on account of the previous outbreaks having been taken there, and the difficulty attended with moving out of cantonment limits and getting into Holkar State territory, thus running the risk of additional expense and litigation. Besides, the cantonment does not offer any other situation. The distance was over a thousand yards from the station veterinary hospital, perfectly open, and only had a village path upon which all traffic was suspended running through. The plan of field hospital is attached.

Forage supply.—Dry grass or hay was issued daily from the Commissariat ricks, and was of a fair sample, though not well harvested in consequence of the rains of the previous year interfering with the gathering ; it was somewhat discoloured, otherwise good, and the horses seemed to thrive well upon it. Some of the grass was harvested in the Commissariat rohruns, two of which exist on the south side of the camp—one measures 1,498½ acres, and the other 1,323¼, total 2,821¾, and producing annually 25

lakhs maunds; whilst the remainder of the supply, amounting to 59 lakhs maunds, is brought in by a contractor from the various rohruns round the district. Taken together, I consider this grass to be the best procurable in the district.

Hariala or green grass.—This grass is brought in daily by the grass-cutters from each troop; when brought in, it is spread in rows to dry before being given to the horses. There is a jamadar of grass-cutters to each troop, who is supposed to look after the grass-cutters and see they do not bring in rank or foul grass. The grass-cutters appear to go in all directions in search of grass, and to be at liberty to gather it from any spot they choose.

I have made various excursions to see the places from where the hariala grass was procured, and the only conclusion I can arrive at is that almost all was gathered from nullahs and banks of the rivers. The grass seemed to be of the usual quality for the period of the year, containing a number of long coarse stems. It was always well dried before being issued as a ration, and the allowance of grass-cutters was according to regulation.

Experiments have been carried out with this grass, with a result that I shall again refer to in my remarks at the end of my report, in summing up my opinion and suggestions about the outbreak.

Bran.—An allowance of one pound daily per horse had been issued at my recommendation; the same was in lieu of an equal quantity of grain and not as an additional issue. The bran was generally of a good quality, fresh, and containing no dirt or foreign bodies.

Gram.—The remainder of the grain ration was made up of gram, which was a departmental supply and issued by the Commissariat Department. The grain appeared to be mixed, some old and some new grain,—otherwise it was an average sample. This *same* supply had been in force for a period of some months, and had not been changed at any time.

Salt.—The regulation issue had been doubled at my recommendation on account of the horses being in such poor condition after the camp of exercise. I noticed a considerable improvement in condition of the horses after its issue. The increase was continued during the rainy season.

(*To be continued.*)

Editorial.

HALF MEASURES IN SANITARY POLICE.

For the total suppression of transmissible diseases, well devised measures, founded on an accurate knowledge of the way in which they are maintained and extended, and energetically and thoroughly carried out, are necessary. When the diseases are wide-spread, or when they threaten to invade, from a centre, neighbouring regions which are under the control of local authorities, then to be effective these measures should be carried out in a uniform manner by, or under the direction of, the supreme government. The experience of this country has amply demonstrated the futility of half measures in dealing with the contagious diseases of animals.

For many years, several most destructive maladies were allowed to reign without let or hindrance, to the great injury of our Agriculture; and had it not been for the rude awakening from senseless apathy, which was experienced when the Cattle Plague had obtained a firm footing in Great Britain, in 1865-66, these scourges might yet have been as active as before that date. As it is, one has been abolished, but others yet linger in a harassing manner, and will probably continue to do so until the Government recognises its duty and proceeds to perform it. To delegate this duty to the disjointed and wayward efforts of local authorities is simply to trifle with the business, and produce dissatisfaction, inconvenience, and needless expense, while the object which is sought to be attained will remain as far off as at the commencement. We are having another repetition of this unwise and unprofitable, as well as vexatious, desultory legislation, in the attempt made to check the prevalence of Rabies. Notwithstanding all that Veterinary Science has done in indicating how this disease should be dealt with, in order to entirely free the United Kingdom from it, and to prevent it invading the country again, and in the face of the evidence laid before the Select Committee of the House of Lords by those most competent to give an opinion on the subject, the old tinkering legislation is apparent in the Privy Council order issued on July 9th.

The malady appears to be on the increase again in some of the Northern Counties and in Middlesex, and deaths from Hydrophobia have been more frequent lately. From the Annual Report of the Agricultural Department of the Privy Council for last year, we learn that Rabies was practically limited to two areas in the country—one in which it is continually existent, a district including the Counties of Lancashire, Cheshire, Staffordshire, Derbyshire, and West Riding of Yorkshire; the other comprising Counties which are close to the Metropolis and including in it Middlesex, Essex, Surrey, Sussex, and Kent. The total number of cases reported during the year was 176, of which 166 were divided between the two areas named, the remaining ten occurring beyond these, we may suppose.

It is remarked in the report: "That the disease might have been extirpated in the two groups of counties to which it was confined, is hardly a matter of doubt; but without the alarm engendered by an extensive outbreak, no restriction on the movement of dogs can be maintained, and we shall doubtless continue to repeat the system of checking the affection and allowing it to spread again as soon as the excitement is allayed. A repetition of the repressive measures is likely to be required soon, as Rabies is steadily spreading in the Metropolis and its vicinity, in the absence of any regulations."

The recent order merely applies to the City and Metropolitan District, and enforces muzzling on all dogs except those actually at work during sport or the capture of vermin; all dogs without muzzles are to be seized and, if not claimed, slaughtered, while those affected with, or suspected of, Rabies, or which have been bitten by a rabid dog, are to be destroyed. This local measure is only to be carried out during the current year, and it may be more or less successful in the very limited area in which it is applied. But it is perfectly evident that it will effect nothing in getting rid of the plague, while it will cause much hardship and annoyance.

When shall we have a Government sufficiently enlightened and resolute to undertake the thorough eradication of this and the other contagious disorders of domestic animals which cause so much embarrassment and loss to the country? It would seem as if governments cannot initiate or lead, they must be driven.

COLIC IN THE HORSE CAUSED BY THROMBOSIS AND EMBOLISM (EMBOLISM OF THE THREE BRANCHES OF THE ILIAC ARTERY, NECROSIS AND ULCERATION OF THE MUCOUS MEMBRANE OF THE CORRESPONDING PART OF THE INTESTINE, PERITONITIS, SEPTICÆMIA).

BY PROFESSOR FRIEDBERGER, MUNICH VETERINARY SCHOOL.*

On the 21st February, 1889, a seven-years-old chesnut mare was brought for treatment to the Munich Infirmary for Horses. It was stated that eight days previously the mare suddenly lost her appetite and coughed a little. Without any treatment the appetite quickly returned, but the mare did not improve. For several days before she was brought her appetite had again become bad, and at last had almost entirely disappeared, whilst at the same time the animal appeared dull and low-spirited. As the owner had brought on the 10th January, 1889, another horse into the hospital on account of Lobular Pneumonia of the left lung (Chest-plague, *Brustseuche*, of German authors), the mare which he now brought, although the temperature in the rectum was only 39·2° C., and no affection of the lung could be detected, was considered for the time being as possibly sickening for the same disease, and was put into a separate stall. On the following day examination of the patient showed the following state of things:—

In moderately good condition; ears and extremities cold; visible mucous membranes of the head pale and lead-coloured.

* Translated from the *Deutsche Zeitschrift fur Thiermedicin und Vergleichende Pathologie.*

Pulse 94 to 100 per minute, small, hard, equal in force but irregular. Heart's impulse on the left side increased and felt over an extended region; heart's sounds normal.

Temperature in the rectum 40·8° C. Respiration 20 per minute, moderate. Nothing morbid to be detected in the large bronchi. No cough, and difficult to produce cough. Percussion everywhere over the lung is clear and full. On auscultation a loud vesicular murmur is to be heard. Cavity of the mouth warm, dry. Tongue covered with a pasty, whitish, sweet-smelling fur. Appetite bad. Thirst small. (The animal took scarcely a third of the quarter ration of fodder which was offered.) The back part of the body had fallen in the region of the upper flank. In the lower part it was tense and strongly tucked up. Bowel gurgling was hardly perceptible. Very little excrement was voided, and what there was of it was in loose balls, which were shiny, owing to their being covered with mucus and a yellowish-grey pseudo-membranous coagulum, which was soaked with moisture and smelt very badly. The urine was strongly acid, and contained two per 1,000 of albumen. Microscopically, it was seen to contain white corpuscles, yellowish-brown, rounded renal epithelium, of which there were, on an average, five to six pieces on one field of the microscope, and numerous oxalate crystals. The mare showed considerable muscular weakness, and was very dull.

In the further course of the day it was observed that the bowel gurgling frequently changed, sometimes being very weak, at other times very loud. Excrement was voided somewhat regularly, about every four hours, but always in small quantity and of the consistence described above. The urine was seldom voided, and always in small quantity. The patient often lay down, and whilst recumbent was quiet; but she only lay for short intervals, and emitted low moans.

Treatment consisted, in addition to appropriate diet, in giving 40·0 antifibrin with 30·0 cinchona bark, pulv. rad. althea, made into an electuary, and given twice within two hours. In addition the animal was given 300·0 of alcohol in its drinking-water within twenty-four hours.

2 p.m. Pulse 90; temperature 39·8° C.; respiration 20. 6 p.m. Pulse 90; temperature 39·9° C.; respiration 24.

2. Early on the following morning pulse was 90 to 100; temperature 40·0° C.; respiration 18.

Pulse exceedingly small, hard, and thready; heart's impulse on the left side abnormal. Appetite entirely absent, only a few pieces of bread being taken. The back part of the abdomen still greatly tucked up. Exceedingly sensitive to pressure in the region of the ribs. (Whether this was an expression of pain could hardly be ascertained with certainty.)

Intestinal gurgling continued to change very much in degree, sometimes being entirely absent. Less and less excrement was voided, its consistence being that of the previous day. The general muscular weakness was increased, and the expression of face was still more strikingly one of suffering. The patient again received 300·0 of alcohol in her water, and an electuary containing powdered digitalis leaves 6·0, cinchona powder 30·0.

After 2 o'clock p.m. slight signs of restlessness appeared. The horse often pawed, lay down for short intervals, and again quickly sprang up. On examination per rectum there was felt pressed against the small pelvis part of the intestine (pelvic flexure of the colon?), somewhat strongly distended with gas. When touched this piece of bowel was decidedly painful, for the animal moaned and endeavoured to withdraw itself from the manipulation. Pressure on the parietal peritoneum did not appear to give pain. At this time well-marked trembling of the extensor tendons of the elbow and of the muscles of the thigh were observed. The animal drew its hind-quarters together and

threatened to throw itself down. At 6 p.m. the pulse was still about 100; respiration 24 per minute; temperature in the rectum 46·4°.C.

3. Third day. In the morning pulse 120; temperature 41·2°C.; respiration 30. The maxillary pulse was scarcely to be felt, and it was very unequal and irregular. Heart's impulse compressed (*drohnend*). The animal was covered with perspiration, which was cold and tenacious. The extremities were icy cold. What was visible of the mucous membranes was bluish red. Peristaltic action of intestines sluggish; very little excrement voided. Symptoms of colic more violent, and at shorter intervals. Muscular weakness and depression are excessive. The physiognomic expression, which had hitherto been one of anxiety, is now stupid and dull. The animal died at midday.

Twenty-five hours after death a *post-mortem* examination was made by Professor Kitt, and the following appearances were noted: The carcase moderately distended. Subcutaneous fat sparingly developed; subcutaneous tissues and muscles destitute of blood. Lungs full of blood, and with isolated blood deposits under the serous membrane, without any other morbid changes. Similar extravasations were found under the parietal pleura. Heart of usual size, and containing a little blackish-red, coagulated, glutinous, and strongly staining blood, which penetrated the endocardium, as well as the inner surface of the large vessels. The heart muscle was washed-out-looking greyish red, appearing as if it had been boiled; it was unusually friable. In the peritoneal cavity there was about a quarter of a litre of fluid blood. The position of the intestines was normal, but a portion of the ileum about 25 cm. long was glued by a fibrinous exudation to the great omentum, which was full of blood, and in the vicinity of the entrance to the smaller pelvis with the serous covering of the abdominal wall. The adhesion could easily be loosened, and it then appeared as if the peritoneum, to which this exudation partly adhered, was itself filled with a vascular network, and was red, dull, and slightly muddy in appearance. The stomach was somewhat fully distended with gas; it contained bright green-coloured and somewhat fluid contents, the mucous membrane of both portions being without any considerable morbid change.

The small intestine contained in its lower portion a considerable amount of fluid. The duodenum and jejunum showed nothing remarkable, except a strikingly pale, sodden mucous membrane, covered with partially detached white epithelial *debris*. The ileum was in the same condition as far as a part about three metres before its junction with the cæcum. Here the serous covering of the bowel, for a length of about three-quarters of a metre, was partly covered with a vascular network, which was partially reddened in spots and covered with thin fibrinous patches of a bright yellow colour, and varying in size. When this was removed the surface was seen to be rough and dull. Between these places there were spots as large as the palm of the hand, which were very slightly inflamed, appearing smooth and shiny, and through which the dirty brownish colour of the other parts of the intestinal tube were visible. In the neighbourhood of the insertion of the mesentery there were frequently to be observed, in addition to congestion of the small vessels with blood, very minute extravasations and yellowish brown exudations under the serosa. The corresponding part of the mesentery was similarly affected, especially in the neighbourhood of the bowel and in the course of the larger vessels. The contents of the part of the bowel which was thus altered in appearance consisted partly of a thin yellowish brown and partly of a thicker red-brown to almost a chocolate-coloured mass.

The intestinal wall was of varying thickness, being in some places three times as thick as in the normal condition, the swelling being chiefly caused through a dirty red or black-red sanguino-serous effusion into the intestinal

wall (submucosa). The mucous membrane, of which the ground tint was a dirty brown-red, showed in spots a bright yellowish, often an almost ochre-yellow colour, and the surface was very uneven. Looked at from the surface, it appeared as if it were covered by a deposit of exudate, but when examined more closely the brighter spots were seen to be due to superficial necrosis of the swollen mucous membrane. The necrosed mucous membrane appeared rough, and thickly fissured over a large extent of surface, or the necrosis occupied numerous rounded parts as large as a shilling.

The margins of the destroyed mucous membrane were separated by a suppurating border, and were raised above the level of the neighbouring congested tissues which had not been destroyed, while the isolated, flat, palm-shaped, mortified parts were surrounded by an ulcerated surface covered with a dirty-grey pus, with which blood was frequently mixed. When the attempt was made to raise such a necrosed part, even although it was as much as four millimetres in thickness from the underlying tissue, it could be done successfully only by employing considerable force, an ulcerated surface being left behind. It was thus evident that we had to deal with a mucous membrane which was necrosed through its whole thickness. As regards the large intestine, the rectum showed minute extravasations of blood under the serosa, and there were also remarkable changes in the pelvic flexure of the colon. Its peritoneal covering was of a scarlet red, in consequence of the smaller vessels being filled with blood. The wall of the bowel appeared thickened two to three fold, through effusion of bloody serum in and under the mucous membrane (hæmorrhagic infarct). The contents of the intestine were dark red, owing to a considerable mixture of blood (hæmorrhage into the bowel through diapedesis). These changes gradually became less marked towards the left portion of the bowel, and there were no signs of any change in the position of the intestine (twisting on axis, etc.).

Examination of the anterior mesenteric artery and of the vessels which are derived from it showed the following changes: The upper colic artery and the region of the iliac branches showed nothing abnormal. The ileo-cæco-colic artery was the subject of a fusiform widening, and was almost filled with a large thrombosis as thick as a man's thumb. The thrombosis had a smooth, rounded, even surface, and was adherent only at a few points to the very loose, greyish-white, thickened, cicatricial-looking, and somewhat raw surface of the vessel. It was continued for a half-centimetre long as a somewhat thick projection into the origin of the interior colic artery and adjoining upper cæcal artery, whilst the lumen of the remaining branches given off by the anterior mesenteric artery were free. We had therefore to do with a thrombus which more or less completely blocked the entrance of the two above-named arteries. Its consistence was somewhat firm, the colour on section looked pure white, but the laminated arrangement was not strongly marked (white thrombosis).

Corresponding to the diseased part of the ileum, with its mesentery, there was found in the three corresponding branches of the iliac artery, and riding immediately over their bifurcations, a fork-shaped embolus about one centimetre long. These emboli were greyish yellow, firm, dry, and unmistakably laminated; they appeared to completely block the lumen of the arterial branches. There was attached to them blood coagula of somewhat recent and also of very recent date, so that the affected vessels were thrombosed from the point of division for a distance of ten to twenty centimetres towards the root of the mesentery.

In the arteries of the pelvic flexure of the colon no emboli were seen.

The liver was very slightly enlarged, coloured a greyish yellow, its edges rounded, the lobular marking obliterated, and it contained a very small quantity of thin frothy blood. The spleen was somewhat swollen, and thickly

set with nodules, some as big as an apple, which projected from the surface. Its tissue was full of blood, the nodules consisting of black-red sanguineous collections. The kidneys were of normal size, loose and soft, and coloured a dirty deep red. On section the medullary substance was found to be remarkably pale and clay-coloured.

Remarks.

When the patient was first taken into the hospital it was considered to be possibly a case of Chest-plague, and there were certain facts which seemed to justify the supposition; but on the second day examination and observation of the animal showed that this suspicion was not justified, the symptoms pointing chiefly to an affection of the bowels (Enteritis). The striking and remarkable sympathy of all the parenchymatous organs, namely, of the heart, kidneys, and muscles of the skeleton, and the central nervous system, a sympathy such as usually accompanies infectious diseases, was attributed to a septic infection of the blood, having its origin in the diseased bowel. When on the second day appearances were manifested which pointed unequivocally to the presence of infection of the peritoneum the diagnosis was made of Entero-peritonitis. As to the cause of the illness we could ascertain nothing. The clinical symptoms, however, pointed so closely to the effects which are known to follow thrombosis and embolism of the intestinal arteries, with the necrosis and ulcerations which they cause, that we were driven to inquire as closely as possible regarding the first symptoms of the illness. This inquiry elicited the fact that in the beginning the animal had suffered from slight temporary Colic. On this ground we considered ourselves justified in suspecting a thrombosis or embolism of the intestinal arteries as the cause of the malady.

The *post-mortem* examination confirmed in the main the diagnosis made during life.

The changes in the ileum must be referred to the embolism and thrombosis of its blood-vessels. No doubt can exist regarding the derivation of the emboli from the thrombosis of the distended mesenteric artery, although at the time of the *post-mortem* inspection absolute proof could not be discovered by examination of the surface of the thrombosis. Several adjacent arterial branches which supplied the bowel were completely blocked up by pieces of the thrombosis, which were carried into the circulation. This led to severe disturbance of the circulation of the blood in the corresponding parts, and in the end caused the death of the animal. The possibility of the blood supply being carried on in an affected part of the bowel by collateral circulation was not possible on purely anatomical grounds, as a compensating blood supply could only take place from the neighbouring free arteries in the anterior and posterior surfaces—that is to say, only to a limited extent. Absolute arrest of the circulation took place in the vessels, and as a result there was severe disturbance of nutrition, death at some parts, and at others ulceration of the mucous membrane; and by transference of the morbid products to the peritoneum there was caused a limited, partly adhesive, and partly hæmorrhagic serous Peritonitis. The result of this condition was Septicæmia, with its injurious influence on the heart, producing Myocarditis, and on the kidney, resulting in Parenchymatous Nephritis. As is known, blocking of the arteries through thrombosis and embolism causes changes of this kind most frequently in the large intestine, where we ourselves have several times observed and described it.* It is more rarely found, particu-

* "Lehrbuch der Spec. Pathologie und Therapie," Friedberger and Fröhner, 2 Aufl., Bd. ii., S. 170.

larly when caused by embolism, in the small intestine, and most rarely of all in the ileum.

Buch has shown how a portion of the intestine cannot easily, and in any case only in very special circumstances, be permanently and completely deprived of its blood supply. To cause this result in the small intestine it is certain that there must always be a blocking in several adjacent arteries. This happens most readily through the prolongation of a plug in the affected and enlarged arteria, ilio-cæco-colica, into the iliac arteries, that is by a thrombosis. It is much more difficult to produce this result through multiple embolisms of adjacent intestinal vessels, as has been the case in the patient whose history we have been describing.*

That the disturbance of the circulation in consequence of embolism and thrombosis of the intestinal arteries, as well as the general condition of colic produced by thrombosis and embolism, is chiefly due to the anatomical conditions cannot be denied; but from the clinical side there are certain points which it is impossible to overlook, as, for example, the fulness of a part of the intestine, the nature of its contents, the strength or weakness of the heart's action, etc.

As regards the morbid appearances found in the pelvic flexure of the colon, the immediate cause must be ascribed to a disturbance of the circulation. In the present case we are unable to state whether the condition was due to occlusion by thrombosis of the one (inferior) colic artery, or by an embolus which had been swept into the vessel by the force of the circulation.

PLEURO-PNEUMONIA IN QUEENSLAND.

REPORT OF THE COMMISSION.

The following is the report presented to the Colonial Secretary, Brisbane, by the Royal Commission appointed to inquire into matters relating to the cultivation of the vaccine of Pleuro-pneumonia, together with the report of Dr. Germont and M. Loir on the results of their recent experiments:—

To the Hon. the Chief Secretary.

Sir,—In accordance with the instructions contained in your letter of the 16th of November last, whereby we were requested "to inquire into the origin and development of Pleuro-pneumonia in horned cattle with special reference to the cultivation of a vaccine for that disease," we have now the honour to furnish you with our report of the proceedings and investigations that have been carried on in reference to the above subject since that date.

On arrival of the French scientists, Dr. Germont and M. Loir, and after consultation with them we made the necessary arrangements for fitting up a temporary laboratory in the old Immigration Barracks, and also obtained the sanction of the Chief Inspector of Stock to make use of the sheep quarantine ground for the purpose of keeping the animals to be experimented upon under continuous observation.

As much of the necessary apparatus as could be obtained in the colonies was procured at once, and the remainder ordered by cable from London. Owing to the special nature of the inquiry most of the instruments had to be made, and we were therefore not able to equip the laboratory as quickly and fully as was desirable, but owing to the kindness of Dr. Germont and

* Deffke has published a very instructive history of thrombosis of the intestinal arteries in a horse which died of Colic (*Rundschau auf dem Gebiete der Thiermedicin*, 1887, S. 390.)

M. Loir, who placed the whole of their apparatus at our disposal, we were enabled to proceed with the experiments without any delay.

On the 16th day of November, a bullock diseased with Pleuro-pneumonia, was found on the run of Mr. De Burgh Persse, of Tabragalba, and an ample supply of virus obtained from it for the commencement of the experiments. The taking of the virus under all the precautions necessary for obtaining it in an uncontaminated state and free from contact of impure air was fully explained to us by Dr. Germont and M. Loir, and we at once saw the necessity for a totally different method of procedure from that usually adopted. As it is upon the entire exclusion of all impure or foreign germs from the virus thus obtained that the success of the future operations, especially in regard to the preservation of the virus, depends the absolute necessity for the strictest care and cleanliness is self-evident; and we would call the attention of all those interested to this most vital point in making any preparations for the purpose either of transmitting the virus or for inoculation.

We may here mention that the virus obtained from the Tabragalba bullock was kept for some weeks not only at the ordinary temperature of the laboratory, ranging from 75 deg. to 100 deg. Fahr., but also in an ice-chest at a temperature of from 35 deg. to 40 deg. Fahr., and that it was found to be fully effective in both cases for a period of seventeen days from the date of taking. After that term it appeared to gradually lose its strength. At what age it would become totally ineffective was not ascertained. As under the present improved postal arrangements tubes of virus could be transmitted to any part of the colony within three weeks, and as other and more important points were pressing for solution, we did not pursue the investigation of this subject any further. It is, however, a very important part of the inquiry, and we recommend that in any future experiments special attention should be directed to it.

The accompanying report of Dr. Germont and M. Loir sets forth the progress and result of their experiments in such a clear manner that any addition to it by us would be almost superfluous. From the large number of animals operated upon (forty-seven in number) the experiments were rendered much more trustworthy than if single cases had been taken, and in view of this, and noting the extreme care and accuracy with which the whole series of experiments were conducted, as also the absolute refusal on the part of the scientists to take anything for granted that was not fully demonstrated by experiment, we are of opinion that the conclusions arrived at and embodied in the enclosed report are fully justified.

In reference to the isolation and cultivation of the microbe of Pleuro-pneumonia, which has, as yet, not been actually demonstrated, we are of opinion that sufficient evidence has been obtained by Dr. Germont and M. Loir to warrant us in stating as extremely probable that even if the specific microbe cannot actually be isolated, still that a cultivated virus can be produced which will give the desired result. The experiments made on animals inoculated with an artificially-cultivated virus obtained from the blood of a calf dead of Pleuro-pneumonia have given results which are very promising, and which we hope will soon be confirmed beyond a doubt by the discovery of the specific microbe of Pleuro-pneumonia.

We are informed by Dr. Germont and M. Loir that their report is to be taken as an interim one, and made especially for the general public of Queensland. A fuller and more scientific one will be issued from Paris after laying their views and conclusions before M. Pasteur and obtaining evidence upon certain points which it was impossible to get in so short a time and with the limited means at their disposal in the colony.

Considering the successful issue to which these preliminary experiments have been brought, and with the knowledge that through them an immense

benefit has been conferred upon the cattle-owners of Queensland, we recommend that an honorarium of £1,000 in addition to the sums stipulated for, and already paid, be granted to Dr. Germont and M. Loir.

We think this report would not be complete without our calling your attention to the great advantage that would be conferred upon cattle-owners by giving practical effect to these investigations and thus placing a supply of pure virus at all times at their disposal. To do this it would be necessary to continue the present arrangement, and if the services of a competent person could be obtained there is every probability of the institution becoming self-supporting through payment being made by stock-owners for pure virus. A certain definite and valuable result has been obtained from the experiments just concluded, with a promise of still further developments being made. To let the matter rest now would, in our opinion, be a waste of both time and money, and we therefore respectfully make the following suggestions :—

(*a*) That a site be granted for the establishment of a permanent laboratory.

(*b*) That suitable buildings be erected thereon for conducting experiments on all diseases of stock.

(*c*) That the services of a thoroughly skilled scientist be secured as soon as possible for the purpose of continuing the preparation of virus as suggested in Dr. Germont and M. Loir's report, and eventually to take charge of the permanent institution.

(*d*) That power be given to sell virus to stock-owners requiring it.

(*e*) That the present board be authorised to prepare and print an illustrated pamphlet, containing as much information as can be obtained for sale to the general public.

It may not be deemed outside our province to refer to the fact that, as the cost of these experiments has been defrayed from a fund contributed solely by the stock-owners of Queensland, the investigation is to that extent a private one. The knowledge gained from, and the advantages sure to follow, these investigations will directly benefit every stock-owner in Australia, and indirectly the whole community. In view of this we may be permitted to suggest that the other colonies on the Australian continent may be invited to contribute towards the cost of further inquiries in the same direction, from which they must ultimately derive an equal benefit with Queensland.—We have the honour to be, sir, your most obedient servants,

EDWARD PALMER, Chairman.
JOHN THOMSON, M.B.
JAMES TOLSON.
P. R. GORDON.

REPORT OF THE FRENCH SCIENTISTS.

The following is the report by Messrs. Germont and Loir (M. Pasteur's representatives) upon their inquiry as to the protection of cattle against Pleuro-pneumonia (translated from the original in French by Mr. H. S. Dutton) :—

Brisbane, March 20th, 1889.

At the request of the Government of Queensland we have endeavoured to solve the following problem :—To find a means which will allow stock-owners to procure for themselves at any season of the year a sufficient quantity of virus to enable them to inoculate a mob of cattle against Pleuro-pneumonia.

The best solution would be to be able to cultivate artificially, in an appropriate medium, *in vitro*, the virus of Pleuro-pneumonia. As this disease is infectious and contagious, it is probably caused by a living agent—a microbe. But up to the present all the numerous efforts undertaken to isolate and cultivate this microbe appear to have failed. It would, therefore, have been

rather presumptuous on our part to have limited our researches to this particular point with any hope of success; a study of this nature demands, in effect, special and complete laboratory arrangements, many tentative researches, and depends much on chance.

We have endeavoured to surmount the difficulty by adopting another course.

Resembling in this point the majority of other contagious diseases, Pleuro-pneumonia can be transmitted by inoculation. If under the skin of a "new" animal—that is to say, of an animal which has not already been subjected to the attacks of the disease—a few drops of virus collected from the lung are injected, an œdema develops itself at the point of inoculation, which spreads considerably and generally causes death. In its turn this œdema is infectious, and can be used to practice fresh inoculations on other animals, these inoculations giving rise to the same phenomena.

Starting from this fact, which has been recognised for many years, we have considered that the liquid constituting this subcutaneous œdema could be used for inoculations at the tail, after the Willems method, as it is practised throughout the world.

But at the beginning we have to reply to an objection.

We were told that this subcutaneous œdema following inoculation has nothing to do with Pleuro-pneumonia, that it is a new and different disease, a kind of Septicemia; that by inoculation the original disease can never be reproduced with its ordinary anatomo-pathological characteristics; that, in a word, it is impossible to cause either Pneumonia or Pleurisy.

We reply, first of all, that it is a mistake to believe that the specific character of a disease consists in an habitual anatomical localisation. In Tuberculosis, for example, the usual seat of the disease is the lung, but cases of Tuberculosis without pulmonary lesions are frequent, and it is even possible to produce a generalised tuberculous infection without tubercles. There is not always a rash in Scarlatina, nor always an eruption in Measles, and the subcutaneous inoculation of the Diphtheria microbe gives no diphtheric angina.

On the other hand, we have frequently been able to provoke Pleurisies with production of false membranes by the direct injection of virus into the pleura, or even by a simple subcutaneous inoculation. In one case we have been able to reproduce a veritable Pleuro-pneumonia by bringing the virus directly in contact with the lung by an inoculation in the jugular vein. Nevertheless, we recognise the fact that in the case of subcutaneous inoculation only a local œdema is generally provoked.

But the liquid contained in this œdema has this peculiarity in common with virus taken directly from the lung: that if it is virulent for horned cattle it appears to have no effect on other animals. As Willems says, "The virus of Pleuro-pneumonia is of a specific nature . . . the bovine race only is affected by its inoculation, for other animals of different kinds inoculated in the same manner and with the same liquid feel no bad effect."

We have in the same way been able to inject large doses of subcutaneous virus under the skins of fowls, pigeons, guinea-pigs, and goats without the least appreciable effect, while this virus inoculated in the skin of young calves reproduced the same œdema.

In any case this discussion is a barren one, and if the experiments we have been able to carry out prove that subcutaneous virus protects in the same degree as natural virus, this practical result will justify the disregard of any more or less specious theoretical objection.

We have thus considered that by subcutaneous inoculation it was possible to cultivate, so to speak, the virus of Pleuro-pneumonia, and to have always at hand the materials necessary for practical wants. We have considered

that it would be possible to do for Pleuro-pneumonia something analogous to what has been done for nearly one hundred years past for vaccine. The virus of vaccine cannot be artificially cultivated in a medium devoid of life, and to preserve it it is necessary to have recourse to successive inoculations from calf to calf, or from man to man. It is known, on the other hand, that vaccine can bepreserved for some time in specially prepared tubes, or on strips of glass, ifit is collected under proper conditions.

Had the same thing been possible for Pleuro-pneumonia, the problem submitted to us would practically have been solved.

The questions which we had to study were the following :—

1. Can sufficient virus be obtained by inoculation under the skin to inoculate a mob of cattle in the tail ?

2. Does this subcutaneous liquid, when it has been inoculated in the tail, protect the animals so operated upon against a second attack of the disease as effectually as the natural virus collected from the lung or from the pleura ?

3. Can the virus be preserved, and if so, how long ?

(*a*) When an ox is inoculated in the tail with Pleuro-pneumonia virus, in the great majority of cases nothing is provoked but a slight local swelling, which disappears rapidly. Sometimes, however, the œdema extends to the upper portion of the tail, from there to the adjoining parts, and death is frequently the result of this complication. What is the exception after inoculations as they are made in practice is the rule if the virus be injected under the skin of the neck, or of the thoracic walls, in those parts which veterinarians designate for this reason "forbidden regions" (Bouley). However, even under these conditions death does not always ensue, and the œdema remains sometimes very limited in extent. To obtain large œdemas with the greatest chances of death, operations on animals which are too old must be avoided, and calves of from six to twelve months old must be chosen in preference. Very young calves are not suitable subjects for experiment. They have not sufficient resisting power, even when they are nourished with milk ; and, moreover, it would appear that the malady tends to generalise itself, to assume abnormal forms, and to kill by general infection without localisation. With adult animals there is the risk of operating on animals which have already been attacked by the disease in a form more or less light, or actually attacked by a different disease, Tuberculosis, for example. However, all conditions being equal, calves are more susceptible than adult animals. Operations on thin and impoverished animals must also be avoided ; besides the fact that the disease may follow an abnormal course, the skin of such animals is deficient in suppleness, and the œdema never contains such a large quantity of liquid.

When inoculation is performed under the skin of the thoracic walls of a young calf—behind the shoulder, for example—with some drops of virus taken from the lung or the pleura of an animal which has been killed during the second period of the malady, a slight swelling is observed after between five or ten days, or sometimes a little later, which increases during the following days both in thickness and in width. This swelling is painful when pressed, and as it expands the temperature becomes progressively higher. At the end of one or two weeks the swelling ends by covering the whole of the abdomen, extending sometimes from the pubic (share-bone) to the middle of the breast-bone, and even to the neck. Generally, however, it remains limited to the side of the body on which the operation was performed. On a level with the parts last attacked the œdema is soft, whereas on a level with the regions first involved it becomes harder and harder. The temperature, which under normal conditions averages 102 deg. to 102·5 deg., rises during the second week after inoculation to 105 deg., 106 deg., sometimes 107 deg., or even 108 deg., Fahr. It often decreases one or two days before death.

In spite of their feverish condition, the animals continue to eat and to ruminate, and it is only during the last days of the disease that they refuse all nourishment, and that rumination ceases. Death supervenes without convulsions.

On opening the body, if the skin on a level with the œdematous parts be carefully dissected in such a manner as to form a sort of bag where the lymph accumulates, it is seen that the latter exists in very considerable quantities; sometimes more than two or three pints can be collected. This lymph, which abounds more especially on a level with the parts last attacked, is of a beautiful amber colour, almost limpid, and in no degree mixed with matter. On a level with the parts first attacked the lymph is not abundant, and the tissue is thicker.

Occasionally the inflammatory process spreads into the thoracic cavity, which it penetrates in following the vessels of the neck, and at the opening of the thorax a more or less abundant pleuritic discharge is found, with production of false membranes.

Animals do not always succumb to the consequences of inoculation, and the chances of survival are all the greater, as the animals are of a more advanced age. The nature of the virus and the quantity injected must also be taken into account.

The following is a brief résumé of the experiments we have made on this particular point:—

With virus collected at Tabragalba from an ox killed at the second period of the disease (Red Hepatisation) we inoculated two calves, which died at the end of three weeks with a very considerable œdema. With the lymph collected from one of them we inoculated three others, which died likewise after an illness of twenty to twenty-eight days. With the lymph taken from one of the latter we again inoculated a lot of four calves, of which one showed only a very limited œdema, two showed an œdema of considerable size with High Fever, and ended by getting better; the fourth died.

An ox of three years old, very thin, inoculated later on with the lymph of a calf which had died after inoculation with virus kept for a month, became very ill, developed a large œdema, and also recovered.

So that out of ten animals inoculated with fresh virus, or virus kept for only a very few days, we had six cases of death; two cases with very considerable œdema, which could have been utilised had the calves been killed at the time when the disease was in full evolution and the temperature was between 105 deg. and 106 deg. Fahr. In two cases the œdema could only be utilised for a restricted number of inoculations.

With the virus which we collected at Monsildale we inoculated nine animals of different ages, from one year to three years. Four only died. Two calves of one year old had a very large œdema, but recovered; one heifer of three years old developed a very limited œdema; the two others showed a larger œdema, but they also recovered.

To what must this difference in the result be attributed? Why did the virus collected at Monsildale prove itself less active than that collected at Tabragalba? In the case of the ox killed at Tabragalba, the disease was in full evolution; while in that of the ox killed at Monsildale the animal had been ill for a long time—was perhaps on the way to recovery—and stock-owners have long known that the best virus is that obtained from an animal which has not passed the second stage of the disease.

It is, therefore, probable that lymph taken from an animal at different stages of the disease does not always possess the same virulence, and fresh experiments will perhaps show that the maximum of virulence is reached at the moment when the œdema continues to enlarge and the temperature varies between 105 deg. and 107 deg. Fahr. We think that at this moment

a calf possessing an œdema of large enough extent to satisfy practical wants can with all security be killed.

But, after all, it is not necessary to give too much attention to this difficulty, for if there is a large mob of cattle to inoculate it will be safer to inoculate two or three calves, and there will be at least one case of death with the requisite quantity of lymph.

(*b*) Does the subcutaneous liquid, when inoculated in the tail, protect animals against a second attack of the disease in the same degree as the virus taken from the lung or from the pleuro in a spontaneous case?

Willems, a Dutch veterinarian, was the first to affirm that animals inoculated in the tail with the virus of Pleuro-pneumonia are refractory to a second attack of the disease, and "brave epizootic influences with impunity." What is the proof of this assertion? If the manner of contagion of the disease were known, and if there were a certain means of communicating it, with its ordinary anatomo-pathological characteristics, this proof would be easily given; it would be sufficient to protect the animals and to show that they are refractory to the disease, while other unprotected animals do not resist it. But if this proof be wanting, we have on one hand the results of the practical experience of stock-owners, and in Queensland there is such a conviction as to the efficacy of the Willems method that we will insist no longer on this point. We have, on the other hand, the fact that animals which have been inoculated in the tail resist a second inoculation in a "forbidden part." We have just seen that if inoculation is performed in the neck or behind the shoulder of a "new" animal (one which has never had the disease, or which has never previously been inoculated) an œdema is caused which generally proves fatal. This inoculation produces, on the contrary, no effect if it has been preceded by an inoculation in the tail. This is a scientific fact which has been known for a long time, and it will suffice to read the articles of Professor Bouley (*Recueil de Médecine Vétérinaire*) to be convinced of its truth.

What we have to do is to prove that the lymph collected in the subcutaneous œdema possesses equally the same protective qualities as does lymph collected in the lung or in the pleura.

With this end in view we made the following experiments:—

We inoculated in the tail with subcutaneous lymph three heifers of one to two years old, and two bulls of one year old.

Two other heifers which were to serve as a term of comparison were also inoculated in the tail, but with natural virus collected at Warwick.

The animals inoculated with subcutaneous lymph underwent no perceptible inconvenience, only a very light swelling on the tail, exactly limited to the point of inoculation, appearing four or five days after the operation, and not lasting more than seven or eight days. The swelling was accompanied by light feverish symptoms, the temperature not rising above 104·6 degrees Fahr.

One of the heifers inoculated with the Warwick virus was affected in exactly the same manner, but in the case of the other one the swelling on the tail rose 1½ feet above the point of inoculation. Inoculation had been tried on this heifer with a slender glass tube, instead of using the syringe with which the others were operated on, so that a small bleeding wound had been made, and the bones more or less touched during the small operation. But the temperature followed exactly the same course as in the other cases.

We had now to submit these animals to the test of a second inoculation made this time in a "forbidden region." After an interval varying from six weeks to two months, these seven calves were, therefore, inoculated afresh behind the shoulder, with about two centimetres of virus, (about thirty-two

drops), collected at Monsildale from an ox suffering from Pleuro-pneumonia at the period of Grey Hepatisation.

The same day, with the same virus and with the same quantity thereof, a second lot of nine animals was inoculated for the first time, behind the shoulder.

Another lot of four calves, which had been used for previous experiments with the subcutaneous virus, and which, as we said above, had resisted an inoculation on a level with the thoracic walls, were also inoculated on the same day, and with the same dose, with virus collected at Monsildale. So that we had on the one hand eleven animals protected, and on the other nine unprotected.

The result of this experiment was as follows:—

Among the protected animals two had a very slight œdema at the point of inoculation, *and none died.* While of the nine unprotected ones four died with the ordinary œdema, four had an extensive œdema and recovered; one heifer of three years old had only a very limited and transitory œdema.

The conclusion to be drawn from this experiment is a dual one. It shows first of all that subcutaneous virus and natural virus collected in a spontaneous case of Pleuro-pneumonia have the same effect, and that their use is optional for protective inoculations in the tail. But this experiment shows us, moreover, that the protection is incontestable; it gives a new scientific confirmation to the data furnished by observation and by practical experience. Stock-owners have noticed that animals inoculated in the tail can, as Willems says, "brave epizootic influences with impunity." We have proved once more that animals so inoculated could resist an inoculation which kills four-ninths of unprotected animals.

There is no doubt that the demonstration would have been still more conclusive if we had been able to procure a more active virus than that we collected at Monsildale, but it is sufficient as it stands.

We now find ourselves in possession of two leading facts: 1. By inoculation in a forbidden part of a young calf of from six months to one year old, a sufficient quantity of lymph can be obtained to inoculate from 1,000 to 1,500 head of cattle, at least. 2. This lymph protects animals inoculated in the tail by the ordinary method, against a fresh attack of the disease.

If, moreover, it be possible to preserve this lymph in a virulent state for a long enough period, it will be understood that any stockowner in the colony will be able for the future to procure the necessary virus to protect his animals.

Many processes have been suggested for the preservation of Pleuro-pneumonia virus. It has been proposed, for example, to mix it with glycerine or with different antiseptics; efforts have been made to desiccate it, etc. As these processes are known by everybody we will follow them no further; it is generally recognised that they are very uncertain, more often illusory, and sometimes even dangerous.

M. Pasteur's researches have taught us that the most corruptible organic matters—blood, urine, animal or vegetable infusions—could be preserved indefinitely without undergoing any putrefaction if precaution were taken to keep them sheltered from outside germs. By the same method M. Pasteur and after him all the bacteriologists have shown that the virus of various infectious diseases could be kept in a state of purity and with all their activity. Thus, to cite only one example, drops of anthracitic (charbonneux) blood can be kept for weeks and months without losing their first virulence.

Is it the same as regards the virus of Pleuro-pneumonia?

This we have endeavoured to decide; but during the short space of time which our researches have lasted, we have not been able to thoroughly sift the question, and many unknown facts remain to be elucidated. Besides,

animated as we were by the desire to arrive at a practical solution, accessible to everybody, we have endeavoured to render it as simple as possible.

We therefore collected, in a pure state, some samples of subcutaneous lymph in slender tubes which had been previously sterilised. Some of these tubes were placed in an ice-chest, while the others remained exposed to the ordinary temperature of the laboratory.

Our experiments were made with lymph seventeen days old, and with lymph preserved during one month—

(*a*) With the seventeen days' old lymph kept at the ordinary temperature of the laboratory, we inoculated two calves, of about one year old, behind the shoulder. One of them died with an enormous œdema, and the *post-mortem* examination made in the presence of Messrs. Gordon and Bruce showed that there was enough lymph to inoculate from 1,500 to 2,000 head of cattle. The other developed just as large an œdema, but after a long illness ended by recovering.

(*b*) With lymph kept during a month seven calves were inoculated behind the shoulder. Only one of these calves died with the ordinary large œdema (this one was inoculated with lymph preserved at the ordinary temperature). Two others had an œdema of considerable size (these were inoculated with lymph kept in an ice-chest) but survived. Four showed neither œdema nor rise of temperature. Although the doses of virus injected were comparatively weak (two or three drops), it appears from this last experiment that the virus has lost a large portion of its virulence at the end of a month. After fifteen or twenty days, on the contrary, it would appear to retain its primitive virulence.

It now remains for us to show what practical benefits can be derived from the knowledge of the facts which we have just set forth.

Let us suppose that in Brisbane, or in any other central place, a station is established where every fortnight two or three calves are inoculated either with virus collected from a case of spontaneous Pleuro-pneumonia, which must be done from time to time to *rejuvenate* the virus, or with subcutaneous virus taken from calves previously inoculated. Enough tubes of virus could be collected in a pure state to provide for all demands; these tubes it will be possible to send by post. With the virus thus obtained, stock-owners can sacrifice two or three calves, which would furnish the amount of lymph necessary for inoculations. Instead of having recourse to a central station, stock-owners could, if they preferred, collect a few tubes of virus from an animal killed on their runs, and send it to a distant station where no case of Pleuro-pneumonia existed, but where it was desired to inoculate a mob before making them travel. All that is required is a few sterilised tubes, a spirit lamp, and a small forceps.

To enable every one to proceed with certainty, we believe a few indications as to the means of collecting virus, and afterwards inoculating it, would be useful.

(*a*) If it is a case of spontaneous Pleuro-pneumonia the diseased lung should be uncovered, care being taken not to injure it with the instruments or with the hands, and the surface of the lung on a level with the point where it is desired to make the collection of virus should be burnt with a rod of heated glass. Having broken the point of a slender tube, the latter should be passed in the flame so as to destroy any germs which might exist on the outside of that part of the tube which is to penetrate the lung. When the tube has been pressed in, some drops of the lymph should be inhaled by slightly sucking, and the slender end of the tube should then be closed with the lamp. The virus keeps equally well if the two extremities of the tube are sealed at the flame, and under these conditions it is much easier to carry. If it is desired to collect the lymph which is often contained

in large quantities in the pleura it will be necessary to first expose the ribs, being very careful not to open the thoracic cavity. The side on which the pleuritic discharge is situated can be ascertained by sounding (percussion). The liquid is often contained in partitions formed of false membranes, but is always sure to be found after a few trials by sinking tubes in different parts of the chest. If tubes with large receivers are available it will sometimes be possible to collect several pints of virus, and to make use of it, after the lapse of a fortnight or three weeks, for inoculations in the tail.

As regards subcutaneous virus, it will be necessary first of all to break, by a smart stroke delivered with an ordinary hammer, for example, the meshes of the connective tissues in which the lymph is imprisoned. This simple act (*tour de main*) facilitates in a singular manner the collection of the virus, and has, moreover, the advantage of mixing the lymph with solid particles. Before sinking in the slender end of the tube, the hair and skin must be deeply burnt in order to destroy the germs existing on the surface.

The virus which it is desired to keep *should be placed in the dark*, and, above all things, exposing it to the direct rays of the sun should be avoided.

The animals which are destinated to furnish the virus should be inoculated in the neck or behind the shoulder, behind the shoulder in preference. It will be sufficient to break the point of the tube and to sink it under the skin by a slight twisting movement—the point would break if it were attempted to press it straight in. It would perhaps be preferable to use a hypodermic syringe, which would make the operation easier, more especially if the animals are difficult to keep still.

When lymph is being collected from an animal which has just succumbed, or which has been slaughtered, it is transparent and limpid, and only appears to contain a few very small granules. But after a short time the fibrine coagulates, and a cloud composed of the fibrine forms rapidly and unites all the solid particles contained in the liquid together. We believe it necessary to inoculate some of this solid matter, which appears to contain active parts of the virus.

About a cubic centimètre (sixteen drops) of virus should be inoculated.

The death of the animals inoculated should be awaited, but they may be slaughtered in full evolution of the diseased when the œdema appears sufficiently large for practical requirements.

The body resting on the healthy side, a wide incision should be made extending from the haunch to the shoulder, and the skin should then be raised in such a way as to form a pocket, in which the liquid will collect naturally and where it can be easily taken. As the lymph is contained in the meshes of the connective tissue, it will be necessary to lacerate this tissue with a knife and to expel the liquid therefrom with the hands. Of course the greatest precautions as to cleanliness are necessary.

In compliance with the desire of the Queensland Government we have, while carrying out the above experiments, endeavoured to isolate the Pleuro-pneumonia microbe—if such a thing exists. In no instance have we been able to obtain a "culture" by trying in various mediums lymph collected either from the subcutaneous œdema or from the pleuritic serosity—which, however, at least proved the purity of the lymph which we employed. In four cases, by placing some blood taken direct from the heart in some ordinary beef broth, we were able to cultivate a microbe, which when inoculated into two heifers produced each time a swelling which remained localised. We have not yet been able to satisfy ourselves as to the specification of this swelling.

Before leaving the colony in which we have received such a friendly welcome, we desire to thank the members of the Board, who have always given us such obliging assistance. We also wish to thank Mr. Henry W. Beck for the vigilant care he has taken of the animals under experiment

(Signed) DR. GERMONT.
AD. LOIR.

SOME CONTAGIOUS SKIN DISEASES OF THE HORSE.*

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THE subject for discussion to-day may derive some interest from its comparative freshness, as this is, I believe, the first occasion upon which dermatoid pathology has been brought before the National Association; indeed, it appears, for some extraordinary reason, to have almost escaped the attention of our medical societies for many years.

Of course, relatively with man, skin affections in the horse are comparatively unimportant; yet it will, I think, be readily conceded that in every-day practice skin diseases are of almost constant occurrence, causing in many instances serious inconvenience and loss.

I have ventured to modify somewhat the title of this paper by the addition of the word *some*, as in the present state of our knowledge it is almost an impossibility to attempt an arbitrary division of equine skin diseases by the terms contagious and non-contagious. Again, it is not quite easy, in attempting classification in this subject, to draw a definite line where dermatoid pathology really begins or ends.

To illustrate this difficulty, I may presume that in a strictly limited paper of this kind those contagious diseases having secondary dermic complications only will be excluded. In this division we have such important maladies as Glanders, in the Farcy form, Variola and Stomatis pustulosa contagiosa, which in any exhaustive treatise on skin diseases would naturally demand some attention, although they may be generally dealt with in a study of eruptive fevers of a specific type.

Further, such important diseases in man as Scarlet Fever and Erysipelas will not be included in our subject, as having in the horse no well-recognised contagious properties, although they find a place in veterinary literature under nomenclature which is of necessity misleading.

Tubercular, diphtheritic, and syphilitic skin diseases are not, so far as I am aware, definitely recorded as affecting the horse. The same may be said of the cutaneous form of Anthrax known in man as malignant pustule.

A disease is reported by Mr. R. W. Burke (India) in the VETERINARY JOURNAL, vol. xix., p. 12 (1884), and there designated "Impetigo contagiosa equi," from its supposed resemblance to contagious impetigo of man; and again in the *Veterinarian*, Vol. lix., p. 691 (1886), he refers to his previous paper, and suggests the analogy of this disease with an affection described by two Continental veterinarians (Friedberger and Frohner), under the name of Dermatitis contagiosa pustulosa. It is described by Dieckerhoff also, under the title of Acne contagiosa. Its contagium is believed to be a bacillus. It appears to be closely allied to equine Variola, but unlike that malady, it is a purely local disease.

A skin disease which made its appearance in London stables in 1887-8, possessing apparently contagious properties, was investigated by Professor Axe, who I think described it as a form of Ecthyma.

* A paper prepared for discussion at the National Veterinary Association's Meeting in July, 1889.

I remember assisting him in the inoculation of an old grey pony then in the College, but the experiment was unsuccessful, and I have heard nothing further of the malady.

Our material for study is thus reduced to those pathological changes induced by the occupation of well-defined organisms from the animal and vegetable kingdoms.

Under this section may be included Ringworm, Scabies, and Phthiriasis.

The present time is especially opportune for the study of Ringworm and Phthiriasis, as both affections have (in my experience) been more than usually prevalent during the late autumn and the spring of the present year, and additional interest is awakened in the subject by the large amount of attention this important branch of pathology is now receiving from veterinarians practising in India, where skin diseases appear to be a terrible scourge; and yet, up to the present time, the greatest possible difference of opinion appears to exist as to the cause of the most prevalent and important form. The very interesting paper published in the March number of the VETERINARY JOURNAL by Mr. Haslam has thrown considerable light upon the malady, and also given an impetus to a further study of the subject.

The disease known in Australia as "Queensland Mange" and "Prurigo" is possibly identical with Indian Ringworm; although, from Mr. Stanley's report last year to the Colonial Government, it does not appear that he has demonstrated the existence of a fungus, but is contented with such abstract generalisation as the following: "This 'Prurigo' is distinctly contagious, the medium being *probably* the fungoid parasitic cells or spores. These are so minute that they readily float in the air." Mr. Tyron, of Brisbane, appears to have *discovered* and cultivated a minute fungus in horses affected with the disease.

From a comparative point of view, the clinical history of Ringworm in England and India is of special interest.

Mr. Haslam points out that horses are possibly a frequent source of infection in the production of Dhobie's Itch amongst the natives who attend these animals, and in England Ringworm is not infrequently transmitted from domesticated animals to men in attendance upon cattle and horses, and conveyed by them to their children without the bearer becoming the actual host; as adults seem to possess peculiar immunity from attacks of Trichophyton tonsurans producing the form affecting the scalp (Tinea tonsurans), although many cases are on record of attendants upon diseased horses becoming affected upon the hands and arms (Tinea circinata). I have seen such cases of transmission myself both from horses and cattle.

This may possibly explain the prevalence of Ringworm in rural districts among children at farms, *indirectly* associated with stock, the actual attendants upon the affected animals (more commonly cattle) being the bearers of the spores into the homes without themselves becoming attacked.

Dr. Anderson, in his valuable work on skin diseases, draws special attention to his interest in the transmission of such affections from the higher animals to man, and quotes several cases of Favus (Achorion Schœnleini) conveyed from mice and cats to children; but in only one case is Trichophyton tonsurans indicated as being conveyed from horses to men, quoted as recorded by Bazin at the St. Louis Hospital, where five or six dragoons became affected from grooming diseased horses. That such transmission is of frequent occurrence is within the experience of many veterinarians, although comparatively few cases are considered worth recording.

In the *Veterinarian*, vol. xlv., p. 287 (1872), several interesting cases are recorded by Dr. Fleming, quoting the late Dr. T. Fox.

As probably not one-fifth of the cases of Ringworm occurring amongst the poor in rural districts ever come under the notice of medical men, domesti-

cated animals are but seldom traced as the primary source of infection in outbreaks of this disease attacking children.

The groom in attendance upon a horse became affected on both hands, and his case proved interesting, as on a finger of the left hand the endophyte developed under the nail, and gradually week by week extended almost to the bottom, proving a most intractable case to destroy. A further point was also illustrated, viz., that agents which readily arrested the disease in the horse (which, as will be subsequently shown, was of a very acute form) had no effect in arresting the disease upon the man's hand (which was also of a severe pustular form).

It is, I think, generally accepted that Ringworm in the horse, as encountered in England, and probably India, is due to the epiphyte Trichophyton tonsurans, as there appears to be no authentic case recorded due to the fungus discovered by Schœnlein, *Achorion Schœnleini*, nor to *Microsporon furfur*, producing Tinea versicolor in man.

Much controversy has centred around the identity of these fungi, and when the subject is approached from the physiological side alone there would appear little possible chance of agreement. It is necessary to compare the life history of these epiphytes in the clinical characters of the diseases produced, side by side with their morphology, when there is some definite evidence for agreement.

In order to fully grasp the import of modifications or apparent differences in these diseases met with in horses in this country and in India, it is necessary to follow the life history of fungi generally, and of parasitic fungi in particular.

De Bary, in discussing the vegetation of fungi, says they require in general the conditions necessary to other plant life, such as light, heat, and favourable environment, every vegetative process having certain limits of temperature, high or low; transgression of such limits in either direction leads to rigidity of growth and modification of form, without destroying life. Fungi, owing to their want of chlorophyll, are unable to decompose carbon dioxide, and must obtain their carbon in the form of organic carbon previously formed in other bodies; they can take up nitrogen from ammonia compounds as well as nitrates.

Common moulds *flourish* in nutrient solutions which are more or less acid, but grow less well or not at all in neutral or alkaline fluids.

A process of respiration accompanies that of nutrition in the vegetating fungus cell, a free exhalation of oxygen taking place; consequently, in taking up their food material, they of necessity induce important chemical changes in the tissues in which they develop.

The development of parasitic fungi upon certain animals may depend upon the material composition of the host, and be dependent indirectly upon the nature of its food.

Anatomically, Trichophyton tonsurans corresponds to all parasitic fungi in possessing spores (from $\frac{1}{7000}$ to $\frac{1}{8000}$ inch in diameter, depending upon the soil upon which they develop, *e.g.*, man or horse), and a mycelium or thallus, the relative quantity of the former or latter depending upon the situation in which the fungus is produced; in the hair follicles, where there is a comparative absence of light, the spores are in excess, but in the epithelium the filamentous expansions of the spores (mycelia) sometimes predominate.

Parasitic fungi attack by means of these spores, or by germ tubes emitted by the spores, or by the hyphæ developed from the germ tubes.

The spores emit a germ tube by *taking up moisture* independent of the host, and when the tubes or hyphæ proceeding from them come in contact with the host they fasten upon it.

In the development of dermic epiphytes, the septate mycelial hyphæ divide

transversely into rows or chains of spores capable of germination, resembling those of Oidium lactis.

When these spores are sown in nutrient solutions, the germ tubes which are at once emitted develop only mycelia, producing spores in the manner just described.

According to Grawitz, Achorion, Trichophyton, and Microsporon are *exactly alike*, differing only in size, which difference is attributed by him to differences in food supply; he considers the three forms to belong to one and the same species; also that Oidium lactis is identical, he having induced a mild herpitic skin affection by inoculation with this parasite.

Kobner declares Trichophyton to be identical with the parasite producing sycosis—Microsporon Andonini, and with the fungus of Pityriasis versicolor (Microsporon furfur); this latter fungus has been transferred by him from man to the domesticated animals, and *vice-versa*, by sowing the spores.

Many of the parasitic fungi possess a remarkable tendency to attack young animals of different species, *e.g.*, Oidium albicans, the fungus of Aphthæ, affect the mouth, throat, nostrils, and skin of face of young infants and lambs. Dr. Anderson says T. tonsurans is rarely if ever met with in adults; this parasite rarely attacks cattle *above* the age of eighteen months, but, strangely enough, the opposite obtains in horses, as the disease is generally met with only in working horses, old animals often presenting the most severe form of the disease.

Now for clinical evidence as to the analogy of Trichophyton tonsurans, Achorion Schœnleini, and Microsporon furfur.

Many physicians have supported the opinion of botanists that they are identical, but I know of only two veterinary surgeons who have expressed their opinion as to the identity of Trichophyton and Achorion, viz., Professor Williams and Mr. Macgillivray.

Inoculation experiments have invariably demonstrated the individuality of Trichophyton tonsurans, either in its transmission from man to man or man to animals, or *vice versa*, by the reproduction of the species of fungus inoculated and the lesions characteristic of attack.

Trichophyton has never been known in natural or artificial development to produce Favus or the converse.

Trichophyton tonsurans (in its subdivided forms, Tinea circinata and Tinea tonsurans) is about equally prevalent in the human subject in this country with Favus; the former is exceedingly common in horses, and is frequently transmitted from them to man; the latter is unrecorded as affecting horses.

Practically, clinical evidence is of far more value in dealing with questions of this kind in pathology, as it is quite easy to appreciate the difficulties of microscopical morphology when a comparison is made with schizomycetes, or fission fungi, in artificial cultivation; *e.g.*, the normal and attenuated form of Bacillus anthracis may present identical features under the microscope, yet inoculation with the one would mean death, and the other a step in the process of protection. This toning down process in fission fungi, by deprivation of oxygen or supplying an unsuitable pabulum in which development may take place, is interesting in comparison with the modification produced in Ringworm fungus by its being exposed to an unsuitable host: its life is enfeebled, its development not vigorous—in fact, it is attenuated and incapable of long sustaining an existence, or of inducing any definite reaction or resistance in the host attacked.

The summer of 1888 being excessively wet, many species of fungi were enabled to develop with especial vigour; for instance, Pernospora infestans caused terrible losses in the potato crop, whole fields being attacked within a few weeks.

In my experience, Ringworm in horses has never so nearly approached an

enzootic form as during the late autumn and spring; some cases developed with such exceptional severity that I was led at first to imagine that some new contagious disease had made its appearance.

After careful experimental investigation, I was led to the conclusion that the severe and exceptional symptoms were due to the presence of a fungus developed under circumstances calculated to produce the utmost vigour in parasitic life.

Mr. A. J. Haslam, in his interesting paper before mentioned, remarks that Ringworm (which he has unkindly christened Tinea furfuracea) is "particularly prevalent at *certain seasons* and stations," indicating that heat and moisture have a favourable effect upon the development of the fungus.

The severity and prevalence of this disease in India is probably due to the general climatic conditions of that country being most favourable to the vigorous growth of the fungus, coupled with the general insanitary surroundings of horses as compared with those in England.

Semeiology.—The objective symptoms vary in different patients, depending somewhat upon the development of the fungus and the amount of resistance in the tissues; *e.g.*, there may be only a desquamating circle (varying in size generally from $\frac{5}{8}$ of an inch to $1\frac{1}{2}$ inch), the epithelium being thrown off in bran-like scales without any exudation of serum, the colour of such patches being a whitish grey; the area of the circle is slowly increased in diameter until two or more circles coalesce; when the fungus has invaded and developed in the hair follicles, the affected circle becomes denuded of hair, the exfoliation of the epidermis is continuous, but the alopecia is never so marked as in the acute eczematous type, where the exudation of serum produces a well-marked vesication, which quickly coagulates, forming dense crusts, the hairs standing out almost at right angles with the body.

When the serum first coagulates, there is often a *yellow* tinge to the crust, which, by exposure, is soon darkened, and the grey dust from the skin gives it the well-known grey colour. If the crust is forcibly removed, the exposed surface will be moist and a thin secondary coagulation will take place; under ordinary circumstances the crusts are removed either by washing or grooming, leaving a series of bald circles constituting Alopecia circumscripta.

In the acute or enzootic form of Ringworm which has been prevalent, as before remarked, during the past winter, the disease is generally confined to the hind quarters, chiefly in the region of the tuberosity of the ischium, and extending downwards to the hocks.

In a few cases it may extend to the flank, and perhaps there will be an isolated patch or two on the thorax, but not frequently. It seems remarkable that in cattle the usual seat is the head and neck, but in severe cases it extends all over the body.

In the ordinary squamous form of Ringworm in the horse, any part of the body may be affected. I have noticed many cases on the side of face, shoulders, withers, and back, where the saddle or harness might convey the spores to their resting-place.

It is remarkable how, in the natural extension of the disease, the spores seem to readily become fixed by germination; and yet in artificial inoculation, if the part is not carefully scraped to obtain a slight serosity, the spores will not easily vegetate, and the experiment may become negative.

It will be remembered that spores must obtain moisture, independently of the host, to commence activity, before they can become attached to it, and set up the chemical changes which, with the reaction of the host, constitute the symptoms of the occupation.

After inoculation there is what may be called, with a little elasticity, the

period of incubation; this was pointed out by Mr. Nettleship in his personal experiment of transmission from the calf (*Veterinarian*, vol. xliii., p. 544, 1870).

He lightly scratched his arm, and fixed upon it a portion of fungoid epithelium and hair; it was allowed to remain *in situ* for five days, and then removed and replaced for three days longer, when it was totally removed. No change was noticed in the part until nineteen days after the complete removal of the infective material, except a little occasional itching. On the nineteenth day a small circular reddened patch was noted, slightly raised and roughened, about the size of a split pea; four days later it had extended to about the size of a sixpence, and at the end of another week the circle was as large as a shilling.

In an outbreak during October, 1888, which I will subsequently detail, I inoculated a young mare to satisfy myself that the disease was really Ringworm. The seat of inoculation was immediately under the saddle pad.

The skin was shaved, and a small centre lightly scraped until the serum started; a fresh crust obtained from the horse already mentioned was then put on the denuded surface, and covered by a pad of flannel and the girth buckled over. It was removed after forty-eight hours. The part appeared slightly swollen, but otherwise normal; the pad was replaced and remained on for a week, when it was removed permanently. The experiment was apparently negative, as the original swelling had disappeared, and there seemed to be no active fungus. In a fortnight, however, from the date of inoculation, an eczematous circle appeared about half an inch in diameter, and a crust quickly formed. This remained untouched for about three weeks, when the circle had gained a diameter of one and a half inch.

The mare was *ungroomed* the whole time, and *no other centre* of disease appeared; the fungus was readily destroyed by two applications of ungt. hydrarg. nitrat.

In the outbreak before mentioned, three horses out of five in the stable were affected almost simultaneously, by what was apparently an acute attack of vesicular eczema, the eruption appearing around the tail in a circle of about nine inches from the anus; *the under hairless portion of tail and the bald area around anus and perineum were alike attacked.* The eruption extended down to the hocks and inside the thighs, as far forward as the stifle.

The accompanying *œdema was so intense* that the horse, which was the most severe case, could only be moved with difficulty, the extremities being an enormous size, and the skin in all the affected regions was intensely painful on pressure; but the *actual* eczematous patches, which were all more or less circular, when lightly scratched were evidently extremely itchy, as the animal evinced the usual symptoms of pleasure.

There were no constitutional symptoms, the appetite and excretions being normal.

The remaining animals in the same stable became affected, as did also one of the attendants, as has been mentioned in the early part of the paper.

A subsequent microscopical examination of the decidual hair and scurf confirmed the diagnosis of Ringworm, by the presence of Trichophyton tonsurans.

The unusual features of this outbreak were the *apparent* spontaneity in the three animals attacked, the remarkably acute eczema, and accompanying œdema.

In another ontbreak, where the eruption assumed similar characters, but without the œdema, the affection spread through the stable of seven horses, but much more slowly, as from the time that the first horse was attacked until the last was well nearly ten weeks had elapsed.

Treatment.—Ringworm in the horse in this country is generally eradicated

with comparative ease; this does not appear to be always the case in India. In neither country, however, is there the difficulty in effecting destruction of the epiphyte as is so frequently the case in the human subject in the form of Tinea tonsurans of children. This may possibly be due to anatomical differences in the human scalp and equine integument, or that in human skin the fungus finds its perfect form of pabulum, and can thus better survive exposure to chemical agents. Probably the main difficulty is in reaching the fungus so deeply embedded.

The acute form of the disease, as detailed in the foregoing outbreaks, is much more easily arrested even than the ordinary form accompanied by squamous skin inflammation; indeed, the severity of the reaction in the host almost seems to arrest the progress of the disease. I found that an aqueous solution of plumbi subacetas, two drachms to the pint, freely applied over the whole of the affected surface and entire quarters, not only arrested the eczema, but effectually destroyed the fungus. In only one case was it necessary to have recourse to a more severe remedy, by the ungt. hydrarg. nitratas, which in my experience is the most effectual agent, possibly excepting hydrarg. bichloridum, in destroying Ringworm in any animal.

Almost all salts of mercury seem absolutely fatal to the development of skin epiphytes, or indeed any kind of fungus; as a solution of perchloride of mercury, at a strength of only one in two thousand, will prevent the growth of ordinary fungi in cocaine solutions.

Unguentum is to be preferred to a solution in the treatment of ordinary Ringworm, as it becomes more definitely fixed to the diseased area, and remains in apposition sufficiently long to destroy the fungus. Often one application is sufficient, if carefully rubbed into and *around* the circle, great care being taken to extend the ointment beyond the apparently diseased area, as the fungus is always extending on the margins of the circle. If the ungt. hydrarg. nit. is selected, it should only be applied every other day, or too severe secondary inflammation may be set up; it will not generally be necessary to apply the ointment more than three times. In some obstinate cases, it is a good plan to scrape the diseased surface with a sufficient firmness to remove all the loose epithelium, and then rub on the ointment.

As almost every veterinarian and physician has some chemical agent in which he has more or less confidence in the treatment of this affection, it is unnecessary to press for the use of any special drug.

Salts of mercury, copper, and lead seem to possess special power in destroying the fungus; also liquor ferri perchlor., iodine tincture, acetic acid, carbolic acid and glycerine, one to three; chrysophanic acid ointment has also been much used in human medicine. I notice that Mr. Haslam strongly recommends its use in veterinary practice, but the basis of his recommendation does not seem to be particularly well founded, as he seems to use it alternately with sulphate of copper ointment, which possesses the power of destroying the fungus. Again, Goa powder is made up into a thin paste with acetic acid, which agent will also readily destroy trichophyton; so that under such conditions it is not easy to define which drug really effects the cure.

Much credit, however, is due to Mr. Haslam for his able investigations into the pathology of a disease which has appeared in the past to be a skittle-ground in which Army veterinary surgeons have contended for supremacy in the art of nomenclature.

No definite lines can well be laid down for the treatment of any individual case of Ringworm, as it is better to consider all the special conditions in operation at the time, and the selection of curative agents will be of secondary importance.

The severity of the attack, its period of duration, the part of body affected,

the breed of horse, thickness or sensitiveness of skin, and the general environment of animal will generally guide us in our line of treatment.

During the severe cases under treatment in the past winter, I found it an advantage, in addition to local treatment, to administer, where much subcutaneous œdema existed, salines with small doses of nitrate of potash, followed by a short course of iron and vegetable tonics, or liquor arsenicalis.

Sanitary Measures.—Immediate isolation of the diseased animals if possible, with clothing, brushes, combs, dusters, and harness, should be insisted upon.

All the clothing and other articles which would not suffer damage thereby should be boiled, others disinfected with solution of bichloride of mercury, one to five hundred.

The disease is chiefly extended in a stable by grooming, and I am of opinion that it is better to allow the affected animals to *remain undressed during the time they are under active treatment*, or, at any rate, special care should be taken not to scratch over the parasitic circles, else the spores will be scattered, and many centres of infection on the same horse be established.

Beyond the primary points of attack, the disease rarely extends if this precaution is adopted.

Any woodwork with a sufficiently roughened surface to fix hair or scurf should be washed with boiling water and bichloride of mercury.

It is, I think, an error to conclude that this disease is *only* found in damp insanitary stabling, where horses are badly fed and imperfectly groomed, as in the instance mentioned, where seven horses were affected; these animals were under the most favourable conditions possible as to stabling, diet, and attention, there being four stable-men to attend to the stud, and everything was conducted in perfect order.

The other divisions of our subject, Scabies and Phthiriasis, are due to parasites from the animal kingdom, sub-kingdom Arthropoda, classes Arachnoides and Insecta.

Scabies.—Mange, Scab, or Itch is probably the most ancient and widely distributed contagious skin disease affecting the horse. It appears to exist in almost every country in the world, and has been known to history from the dawn of civilisation; the mites appear in geological history in the Prussian amber, although the *parasitic* nature of the affection was not discovered until the twelfth century, by an Arabian physician.

It would seem to have been regarded as the one skin disease affecting horses in this country for many years; and the impression is by no means entirely shaken off in some quiet corners of the country, where education filters slowly down to those who are in attendance upon animals.

Professor Spooner is recorded to have said that "if the skin diseases were tumbled into a bag they would come out principally Mange."

Sanitation has had a remarkable effect in reducing the prevalence of this affection, as, in general practice, Scabies is by no means the most frequent form of skin disease, although possibly this may be true of *contagious* skin affections.

This will be a special point of interest for discussion, in demonstration of the advantages of veterinary sanitary science.

In man Scabies still appears to be by far the most common dermic condition with which the physician is called upon to deal; as Dr. Anderson, in his analysis of ten thousand cases of skin disease occurring in *hospital* practice, registers the enormous proportion of two thousand five hundred and twenty-seven as Scabies.

Consequently, men and horses appear to be no more fortunate than the most humble forms of animal life in escaping the attacks of this remarkable

family of parasites; as almost every animal, from the common house-fly upwards, has its own besetting acarus, and almost every British bird has its companion "mite," when the latter is sufficiently fortunate to find its host.

Some animals have the unfortunate privilege of acting the part of host to two or three species of acari, the horse being one of the number; indeed, it will be shown subsequently that attempts have been made to establish extra species as parasitic upon this animal, although this will, I think, require confirmation before being generally accepted.

The acari differ anatomically from other arachnids, in the abdomen being unsegmented and not distinctly separated from the cephalo-thorax; the tracheæ or air tubes open on the surface of the body, and internally break up into branches admitting air into the tissues. Each species parasitic upon the horse has its distinguishing anatomy, the male and female being equally differentiated.

Their general conformation will be best understood by consulting the drawings, where the sexes of psoroptes, sarcoptes, and symbiotes are depicted side by side. These drawings, with the exception of sarcoptes, are made from the slides upon the table by Mr. J. D. Roberts, M.R.C.V.S., Aberystwith, to whom I am indebted for the whole of the illustrative material of my paper, excepting the photographs, which were taken by Mr. Biddle, of Dartford, from patients under my care.

The sarcoptes are taken by kind permission from Dr. Fleming's "Sanitary Science and Police," as I have been unable to obtain an original sarcopt in this country.*

In a careful examination it is almost impossible to mistake the species; psoroptes and symbiotes closely resemble each other, but the former are more than three times the size of the latter, the symbiotes being distinguished by the unaided eye with considerable difficulty; this comparison is readily made by holding the slides up to the light.

Under an inch objective the form of psoroptes can be well seen, its pointed head being characteristic (a slide upon the table shows the long pointed mandibles separated); in symbiotes the head is more obtuse, and in sarcoptes it is rounded and very short.

The fore legs of each species are armed with minute hooks, which in psoroptes are the most formidable; they are relatively smaller in symbiotes, and are almost rudimentary in sarcoptes. In Mégnin's drawings, shown by Dr. Fleming ("Sanitary Science and Police," vol. ii., page 412), the symbiotes are represented as having no hooks on the fore legs, the suckers being directly continuous with the terminal pointed segments of limbs. This is not strictly the case, as the suckers in each species are identically placed immediately underneath the hooks, the latter being a direct continuation of and termination to the exoskeleton.

The remarkable power possessed by the creatures over their fore limbs may be well seen if they are mounted alive in glycerine, and examined under a quarter-inch objective.

As is well known, each segment from the body towards the point of the limb becomes smaller, and the mite is enabled to contract the limb telescopically, the sucker being expanded and contracted with beautiful precision, resembling the movements in the trunk of an elephant.

In *sarcoptes* the fore limbs are, in comparison with the two other species, extremely short, but in the hind legs the most remarkable differences are noted. The body of sarcoptes is almost ovoid, and the hind legs are

* Since the above was written, a case of Sarcoptic Scabies has come under my notice, an acarus from which may be seen upon the table, also a photograph of the patient.

attached well under the body; the inner legs being posteriorly placed, and being very short, they cannot be seen when the dorsum surface of the mite is exposed, the situation of limbs being indicated only by the protrusion of a pair of long pointed hairs. Exactly the opposite to this obtains in psoroptes and symbiotes, the hind legs being enormously long, with the following modifications: In the male psoroptes the outer hind legs are very long, and terminate in a small hook and sucker, with a long hair extending backward from the middle of last segment; the inner pair of hind legs are about one-third the length of the outer, and terminate in a fine hair; between the inner pair of hind legs are two abdominal lobes parallel with the generative organs; from each lobe proceed three hairs. In symbiotes these processes or lobes are as long as the inner pair of hind legs, and in place of the two inner hairs a long, spathe-like process extends backwards beyond the outer pair of hind legs, which has suggested the name for this species, Symbiotes spathiferus.

It is quite easy to overlook the spathes altogether, as they are not directly in focus with the hairs and lobes; the inner hind legs have terminal suckers.

In the mature female of psoroptes and symbiotes the hind legs are identical, excepting in size; the inner pair of legs terminate in a sucker, the outer in two long hairs, growing from separate papillæ, the outer of which is longest.

The females are sexually mature when about half grown, and before the inner hind legs are developed; in fact, at copulation they will be found almost rudimentary, the posterior part of the body retaining its rounded larval form. The process of pairing in psoroptes and symbiotes occupies a very considerable time (I have not observed it in sarcoptes); the two valves at either side of the abdominal lobes of the male become inserted over the papillæ at the caudal margin of the young female, the spathes and abdominal lobes being passed over her back.

After copulation the female rapidly develops, the hind part of the body becoming almost square, and her size considerably exceeds that of the male in psoroptes; in symbiotes the mature female is much longer, but about the same breadth as the male.

Each female (sarcoptes) appears to be capable of producing from fifteen to fifty eggs (Hebra, Gerlach, Mégnin), the period from oviposition to maturity being from fourteen to sixteen days.

These observations have been chiefly made in the species Sarcoptes hominis, but probably apply with equal truth to psoroptes, which develop in a few weeks by thousands, and extend steadily over the surface of the body.

The reproduction of symbiotes is a much slower process, and contrary to the conditions generally noted in sarcoptes and psoroptes (where the females are enormously in excess), the sexes seem to exist in about equal numbers.

The habits of the parasites will be briefly considered in treating of semeiology.

An additional species of acarus has been mentioned as attacking the horse, and is described by Mr. R. W. Burke, in the VETERINARY JOURNAL, vol. xv., page 3, as the *cause* of Stomatitis pustulosa acarosa.

He commences the article by saying, "This disease is unknown in veterinary literature;" and on page 4, "These acari I have shown to the other veterinary surgeons in this garrison, having demonstrated them under the microscope; and we are none of us disposed to doubt the identity of these creatures, as being genuine specimens of *either the one or the other of the varieties of the equine acarus.*" The reader, however, may satisfy himself of the truth by study of the sketches appended. This conclusion, which is not highly complimentary to "the other veterinary surgeons in the garrison," is somewhat modified by a note in the *Veterinarian*, vol. lix., page 695, inasmuch

as the acarus which was in 1882 "undoubtedly either the one or the other of the varieties of the equine acarus" has in 1886 become the Acarus farinæ.

Mr. Burke's paragraph is especially definite, as he represents the presence of this acarus diagnostic of a special disease, and it is important that its identity should either be established or disproved. It reads thus: "(7) Stomatitis pustulosa contagiosa acarosa, in which the presence of the *Acarus farinæ* will always determine the diagnosis" (Burke, VETERINARY JOURNAL, 1882).

If Mr. Burke has written anything beyond my quotations respecting this *equine* acarus, I must apologise for my strictures upon his conclusions, which I regard as misleading and erroneous.

A glance at the drawing of Mr. Burke's acarus will show that it has little in common (excepting its *eight* legs) with the *parasitic* acari of the horse; indeed, it appears to have no anatomical convenience for a strictly parasitic life. It is exceedingly unfortunate that Mr. Burke was not successful in finding a complete specimen for illustration, but sufficient of the animal is shown to indicate that it is not identical with Sarcoptes, Psoroptes, or Symbiotes equi, which was Mr. Burke's conclusion in 1882.

Further, its identity with *Acarus farinæ*, which name it received in 1886, is not difficult to disprove, as again the anatomy of the creature is helpful.

A good drawing of the flour mite is shown by Mr. Jabez Hogg, M.R.C.S., F.R.M.S., in his book on the microscope, p. 639. It will be noted that Mr. Burke's acarus is quite distinct from this mite, which has well-marked semicircular hooks at the end of the legs, and the conformation of the body is altogether different.

As non-parasitic acari (and Mr. Burke's specimen is evidently one of these) abound in vegetable matter, it is not difficult for them to become associated with such a disease as Stomatitis, without in any way being a *cause* of this affection. Mr. Burke says, in concluding his article, that "it is only to those who wait that success will eventually come." It may, therefore, be hoped that he will, on some future occasion, be enabled to establish the life history of his new acarus, aud demonstrate, upon some really reliable evidence, that its presence upon the horse is anything more than a coincidence.

The three forms of Scabies which we have to consider are known as Psoroptic and Sarcoptic "Mange," and "Parasitic Grease" or "Parasitic Eczema," each form being due to the reaction of the tissues against the occupation of the acari. In the first and second conditions the lesions are generally diffused, *i.e.*, they may be distributed over the whole surface of integument; while in the latter they are generally confined to the extremities, and frequently still more definitely to the parts below the knees and hocks, the hind legs being first affected.

In all our leading text-books Sarcoptic Scabies is generally assigned the premier place in descriptive articles. It is somewhat difficult to account for this (excepting that such works are modelled upon the basis of Continental writings), as the disease is evidently exceedingly rare in this country. Fleming, in writing of Psoroptic Scabies, says, "In this country I am not aware that any other variety of Mange is usually recognised." Robertson says Sarcoptic Scabies is "rather less common than the other form." With one solitary exception, our clinical records are, so far as I am aware, destitute of any authentic case of Sarcoptic Scabies, the one case being recorded by Mr. C. J. Blenkinsop, in the *Veterinarian*, vol. lvi., p. 171, while a student at the Veterinary College, Camden Town. The case was diagnosed by the late Prof. Robertson "as a probable case of Sarcoptic Mange," and although no acari were found during the life of the animal, the correctness of the diagnosis was demonstrated *post-mortem*, as recorded by Mr. Blenkinsop.

I have in my possession an immature specimen of sarcoptes from this

case, which I received at the time from my lamented friend Prof. Robertson.

Mr. Blenkinsop, at the conclusion of his much-valued article, writes, "This form of Mange seems much more prevalent in London and our larger towns than it is usually considered to be; but from the great difficulty of obtaining the parasites from a living host, one is not always able to recognise it."

I have certainly some reason to doubt the "prevalence" of this form of Mange, in this country, at least, as with the view of illustrating this paper with original drawings, I have applied, with negative results, for a specimen of this acarus to all the veterinary schools in Great Britain, to most of the leading firms in London who sell acari, also to the best-known mounters, and to the professional mounter for the University of Paris. I have also gone through the acari in the catalogue of the Royal Microscopical Society, and strangely enough, the equine varieties are absent in an otherwise important list.

Considerable uncertainty appears to exist in our literature on Scabies, as to the exact form of the disease, and confusion is imported by naming the acari incorrectly. Mr. A. E. Macgillivray, in an interesting article on the destruction of acari, etc. (*Veterinarian*, vol. xlvii., p. 98), writes of certain drugs, "I have used *extensively* for the destruction of the Mange mite (Sarcoptes equi)." This statement would naturally lead one to infer that *Sarcoptic* Mange was, in that gentleman's experience, of common occurrence. It will be interesting to hear from Mr. Macgillivray if such is the case, and if he has been enabled to demonstrate his diagnosis with mounted specimens of the acarus.

Again, he quotes certain drugs as "very beneficial to kill *Sarcoptes hippopodus* or Symbiotes equi."

I quote this latter statement, not with the view to criticise the nomenclature of the writer, but in the hope that some confusion upon the point may be cleared up, as the gentlemen possessing the necessary knowledge to do so are probably present at this meeting.

Prof. Williams, in his work on Scabies, quoting Hering, describes an acarus found in chronic Grease, named Sarcoptes hippopodus, illustrated by a woodcut; and a foot-note indicates that a specimen of that parasite was discovered by Prof. Walley upon the legs of a horse at Leith. He further says, "The presence of *this* parasite in chronic Grease is accidental."

Again, Gerlach is represented as designating *that* epizoön as Symbiotes equi.

The drawing of Symbiotes equi (by Gerlach, a good one of a mature female) on page 651 is the parasite well known to veterinarians in this country by that name; consequently, the creature described by Hering and shown by Prof. Williams on page 633 must be an accidental importation into the subject of Scabies, as a glance at the two drawings will clearly indicate the impossibility of any observer describing them as the same species.

The point I am anxious to clear up is the identity of Hering's Sarcoptes hippopodus! Did Prof. Walley find an acarus identical with the representation of Hering's parasite? If so, it may be taken as established that four distinct species of parasitic acari exist upon the horse in this country.

The presence of acari upon the skin does not in itself constitute disease, but the secondary dermic changes due to their development establish a series of conditions met with in various skin affections, such as pruritus, papular, vesicular, and pustular inflammations, followed by local or general alopecia or by desquamation of the epidermis.

The symptoms of Psoroptic Scabies are intense itching, which is most evident when the animal is quiet in its stable, and its attention not diverted from itself; or during grooming, when the animal leans towards the operator, generally bending the back and extending the neck, elevating the head and curling the upper lip; the process evidently affording the animal extreme pleasure and comfort. This action on the part of the animal is, however, not peculiar to Scabies, as it is frequently noted in Phthiriasis, and occasionally in non-contagious skin affections accompanied by much pruritus.

The itching is not marked until the parasites have been in occupation for some days, when the resistance to their attacks is evidenced by an exudation of serum in the area where they are working; this exudation causes elevation of the hair, and when the serum coagulates the crust or scab fixes the hair in an erect position. When the crusts become firm and dense, the acari quickly extend the circle or migrate to a fresh centre of healthy skin.

They, however, frequently continue to work in an irregular outline from the first point of attack; the crusts may became removed by the constant rubbing and scratching of the animal, and a denuded or raw surface is exposed, sometimes many inches in diameter.

By far the most serious dermic changes are produced by the animal's attacks upon itself, the secondary inflammation caused by the rubbing being more important than the actual mischief done by the mites.

Some writers distinguish between Sarcoptic and Psoroptic Scabies, by describing the lesions of the former as vesicular, and the latter as papular. Fleming ("Sanitary Science," vol. ii., p. 40) says, "Psoriasis therefore characterises Psoroptic Scabies, as eczema characterises Sarcoptic Scabies."

I am not prepared to speak personally of the characteristic lesions of Sarcoptic Scabies, but most distinctly do I deny the absence of eczema in the psoroptic variety; indeed, a well-marked eczema is rarely absent, in my experience.

On the patient shown in photograph No. 5, eczema was peculiarly well marked, each newly invaded area showing, when the hair was turned back, the bright yellow, newly dried serum, identical with acute vesicular eczema. I am fully prepared to admit the existence of psoriasis in chronic "Mange," but I regard this condition as secondary, due either to irritants applied to destroy the acari, or to the resistance of the host to the intruders.

I may again call attention to the photograph above mentioned, as the typical psoriasis of Scabies is there well shown from the withers to the lumbar region, and extending laterally from the spines of vertebræ for seven or eight inches.

This condition was induced by repeated irritants applied by the owner to kill the disease—and the more it was killed the more it seemed to be alive.

This *over-treatment* of Scabies is to be strictly avoided, or squamous inflammations will certainly follow. Much of the integumental induration so frequent in old-standing cases of "Mange" is due to the perpetual daubing on of dressings and ointments when the acari have long since left the neighbourhood for healthy skin. This also is clearly shown in the photograph; fifteen to twenty fresh and isolated centres may be counted below the trace line. Here the acari existed in hundreds; the elevated patch of hair about six inches from the triceps muscle afforded me over fifty parasites, and I probably left many scores; the owner had not applied any dressing to this part of the body.

As psoroptes do not *burrow* like sarcoptes, they constantly migrate, and can always be found on the outer margin of infected areas in the greatest numbers.

Scabies is distinguished from the various forms of eczema and psoriasis by the intense itching, the behaviour of the animal when under examination,

direct evidence of contagion, and the presence of acari, which in the variety psoroptes is easy of demonstration. This evidently is not an easy task in the case of Sarcoptic Mange, for, as I have before stated, none of the eminent veterinarians in this country who have made this disease a special study are in possession of the parasite.

For the symptoms of this form of Scabies I will quote Mr. Blenkinsop's article (*Veterinarian*, vol. lvi., p. 171): "There was a uniform eruption of a vesicular character over the whole of the body, accompanied with great irritability of the skin, which was covered with small scabs. These scabs were more or less adherent to the cuticle, and on their removal moist denuded surfaces remained, in the centre of some of which a minute puncture could be made out with the aid of a lens. The true dermal tissues were in some situations greatly thickened; this was especially noticed over the neck and shoulders, where the skin was thrown into *vertical folds*."

In Symbiotic Scabies, Parasitic Eczema, or "Grease" the lesions are invariably confined to the extremities; the hind legs generally appear to be first attacked; in fact, the disease often exists for many weeks without the fore limbs becoming affected. The itching is intense, and probably the first symptom noticed is the animal stamping vigorously at night, and rubbing the legs in every possible way with the opposite foot or shoe, and at the sides of stall; when the parts are lightly scratched, the animal behaves exactly as in the less localised forms of Scabies.

The acarus invariably commences its attack at the hollow of the heel or about the centre of the pastern, and quickly induces a *marked vesication*.

In one outbreak of this affection, which extended simultaneously to three horses in a stable standing side by side, the vesication was so marked at the heels and posterior parts of the coronet as to appear, upon a cursory examination, like equine Variola; but the itching, and one animal in the stable being affected with "chronic Grease," indicated Scabies, which was demonstrated upon a microscopical examination of the contents of the vesicles.

Crusts generally form on the coronet from the exuded serum, but at the back of the pastern the sebaceous glands become congested, and the characteristic discharge of grease follows. As the acari work up the limb, the area of irritation extends, but so far as my experience goes, vesication is never observed above the fetlock, eczema here being the chief symptom, with denuded patches and hæmorrhagic lines or scratches produced by the vigorous rubbing and scratching, the latter being the cause of the roughened and distorted condition of the hair. The acari rarely travel above the middle third of tibia, although the itching peculiar to Scabies is noted when the animal is lightly scratched on the inside of the thighs; but this is, I believe, simply due to hyperæsthesia.

Symbiotic Scabies is less contagious than either Psoroptic or Sarcoptic, probably because no harness comes in contact with the affected parts, and when an animal gets "itchy legs" the attendants avoid grooming as much as possible, owing to its restlessness.

Sarcoptic Scabies is described by some writers as the most contagious form, owing to the wandering habits of the male acarus. I am very strongly disposed to doubt this statement; certainly any disease more contagious than *ordinary* "Mange" is hard to find; if extension is slow, it is unerringly sure.

I have on many occasions known every horse upon a farm to be affected before proper curative and sanitary measures had been adopted.

The natural habits of psoroptes also appear to me to distinctly favour their conveyance from one animal to another, living, as they do, in large groups upon the skin, covered only by crusts of serum, and they quickly wander upon the surface if the host is exposed to warmth, either by harness, clothing, or the sun's rays.

On the contrary, the sarcopt is most difficult to unearth, in spite of scalpel and lens, and lives under the epidermis, in addition to the artificial covering induced by the exudation.

Sarcoptes attacking the domesticated animals do not, according to Dr. Fleming, burrow, forming cuniculi as does the human Itch mite (Sarcoptes hominis). I am not prepared to contradict this statement in its application to the horse, but it is certainly not true of Scabies in the cat; as Dr. Fleming has in his possession a very fine section of the skin of a cat affected with Sarcoptic Scabies, in which, besides free acari, are to be seen cuniculi containing from six to nine ova—if I counted them correctly—in various stages of development. There is one remarkable difference in the burrows—they are at right angles with the surface of the skin, and parallel with the hair follicles; this may also possibly be true of the horse, and account in some measure for the great difficulty in demonstrating the presence of Sarcoptes equi.

As has been pointed out, each animal seems to possess its own special acarus, which confines its attacks to that particular animal with such rigid conservatism that any other species is comparatively safe from its invasion. The one exception appears to be the sarcoptes. The equine variety is recorded as parasitic upon man for a period sufficiently long to induce an artificial Scabies, if such a term may be used (*Veterinarian*, vol. lvi., p. 172).

Mégnin was successful in cultivating Sarcoptes notoedre (cati) upon the horse, and in inducing thereby a veritable Scabies.

The man who was in attendance upon the animal already alluded to became affected upon the hands with an intense irritation and diffused redness, with slight œdema, which caused him great annoyance for several days; he said "his hands felt like a bed of nettles." I made a careful microscopical examination of his skin, but could detect no acari. Was this a case of temporary occupation of psoroptes? Or was it simply a case of hyperæsthesia? the man being of a nervous temperament, and under the impression that he had contracted the disease of the horse.

Treatment.—In the treatment of Scabies, the point to be aimed at is the destruction of the acari if possible, without inducing secondary inflammation, eczema, and psoriasis, which so commonly follow "Mange."

Success is determined possibly more by a thorough application of the remedy chosen, than by superiority of one chemical agent over another.

Mr. Macgillivray, who has a wide experience of Scabies, strongly recommends staphisagriæ pulvis, either in the form of an unguentum or decoction. Professor Williams also recommends this agent in preference to others. Dr. Fleming speaks favourably of this drug, but considers it more expensive than other agents which act equally well; he gives preference to an ointment composed of adeps, sulphur, and potass. bicarb., which is the favourite prescription of M. Mégnin, whose vast knowledge of the subject entitles the ointment to the position of a standard remedy.

Unquestionably, any ointment or dressing having sulphur as a basis may be regarded as satisfactory, if no agents are added possessing severe irritant properties.

I generally use a dressing which has at least one advantage to commend it, viz., that it never fails to destroy the acari; it is composed of ungt. hydrarg. fort., sulphur flav., ol. tereb., and ol. lini; this can either be made into an ointment or dressing, as desired, by regulating the quantity of oil.

In Symbiotic Scabies, where the extremities only require treatment, solutions of liq. plumbi subacet., hydrarg. bichlor. and glycerinum are very useful. But chronic cases require a more stimulating application; a good one being equal parts of ol. picis, ol. tereb., and ol. rapii.

After *isolation* of the affected animals, they should be thoroughly washed

all over with soft soap and water, and when dried the dressing selected should be thoroughly applied *all over the body and extremities, no portion of the skin escaping the dressing.* I am of opinion that Scabies, when once thoroughly established in a stable or upon a farm, is most economically eradicated when the primary dressings are of the most complete character.

I have known Mange to exist for many months in stables where the daubing process only is resorted to—that is, where only the apparently affected parts are dressed, and the remainder of the skin untouched. Under such circumstances secondary outbreaks are constantly occurring.

The dressings should remain upon the animal for four or five days, during which time *no grooming must be allowed;* when a final washing with soda and water and soft soap will effectually remove all trace of oil, etc., and the skin will quickly resume its healthy appearance.

(*To be continued.*)

THE HORSE IN CHINA.*

THE shaggy, unkempt, gaily-caparisoned Mongolian Rosinante, provided with a necklet of bells, such as we see it daily in the suite of a mandarin, or in the service of the pig-tailed cavalry, is certainly an object that might excite our admiration. Compared with its Arabian, and even European kindred, the Mongolian steed occupies a very subordinate position; and, considering the circumstance that the Chinaman appears to bestow so little care on the animal, one might also be justified in believing that it stands exceedingly low in the national esteem. Such, however, is not the case, for horse-breeding has enjoyed particular care and attention in the Middle Kingdom.

The most ancient documents which the history of China has to shew, refer to the horse as regards its use in war, in the chase, and in agriculture. In the Chou Dynasty horses were the object of special legislation, and were divided into the following six classes: horses set apart for the Emperor and nobility; those used for warfare; those used for draught and agriculture; those used for forwarding government despatches; those for the use of private persons; and beasts of burden. To the Emperor alone no less than 40,000 war horses were assigned, and the princes and nobility were also entrusted with an important number of these animals. The art of riding was very much cultivated at this time; to no man was it permitted to become a horse soldier before his thirty-fifth year, or to remain one later than his fiftieth. He had to be big, robust, and strong; active, and firm in his saddle. "The good rider," it is written in a book of the period, "must be grown together with his horse, as the bark with the tree; besides which, the swiftness of lightning, the immovability of a rock, and the lightness of a feather must characterize him." As long as this warlike spirit was maintained among the people, and the simple hardy life was regarded as the most honourable, China had also a fiery race of horses to show. As soon, however, as the country sank into sloth and voluptuousness, and in the interior of the kingdom disturbances broke out, the breed also decayed. The ease in which the horses were reared and the circumstances that prodigious numbers of them were allotted to the Imperial stables, had as a direct consequence the degeneration of the animals, and thence a great mortality among them. The injury that was effected during the Han dynasty was so great that when the first Emperor of the T'ang dynasty mounted the throne, it was found that the whole cavalry of China counted only 5,000 horses. At his death, however, he left to his successor not less than 700,000 horses for selection in the different provinces of his kingdom. It is even said that the number had so much increased a short time after that, that horses were actually more

* Translated from *Der Ostasiatische Lloyd.*

numerous than camels, sheep, and oxen. This state of things, however, did not last long, and the country relapsed again into corruption of morals. The department to which the inspection of the government stables was entrusted became negligent, epizoöties broke out among the animals, and when towards the end of the 13th century the Sung dynasty was overthrown by the Mongolian hordes, it became evident that it was quite impossible to oppose them by an adequate force of cavalry.

It was principally the Mongolian horses through which China was conquered, but the damp atmosphere did not agree with them, and the corruption among the native inspectors was so great that when the Yuen dynasty again was expelled, they could not raise a sufficient number of horses on which they could make their escape. These were altogether the most important fluctuations which hitherto had characterized horse-breeding in China, and it should not be without interest in connection with the subject to consider the theories which are current among the Chinese with regard to the proper treatment of the animal. All horse stables should face the south; moreover, a horse should never be reared in the neighbourhood of silk-worms. The belief is even common among the Chinese that one only need rub the teeth of a horse with the refuse of a silkworm in order to prevent it from chewing its food; in fact, a few mulberry leaves put into the mouth of a horse are sufficient to take away his appetite for ever. The pig-tailed naturalist declares that the insignificant size of the ears of a horse proves a correspondingly small liver; moreover, the size of his nostrils corresponds with that of his lungs, and are, besides, a safe sign of the endurance which an animal will develop in a race; the size of its eyes corresponds to that of its heart—thereby a sign of the courage of the animal. A horse hates galloping when it has the wind at its back; but the exercise is pleasant to it when the wind blows in its face. When a horse rolls on the ground, and makes no preparations to get up again, it is a safe sign that its bones are hurt; when, on the other hand, it does not shake the dust off after having risen, something is the matter with its skin; but if while shaking the dust off the animal ceases to snort through its nostrils, it has a pain in its chest. If a horse becomes ill, then something is usually wrong with heart, stomach, lungs, kidneys, or liver. If the animal has heart-disease, the tongue becomes bright red; with a stomach-ache its lips fade in colour, etc. The average life-time of a horse is thirty-one years—half the age of a man, and twice that of an ox. The fact that many horses die before their thirty-first year shows that they have not been properly treated. In order to extend its life to a natural length, three things are necessary, namely, a horse should never be transported from its home country to a foreign land. The Tartar horses, they say, pine away when taken to the warm damp provinces of the south, being accustomed to the fresh air of the western deserts and the hard life there; and the enervating climate and richer food result in early death. That this is something more than empty air is shown by this, that when the conquered Tartars of the T'ang dynasty had to pay their tribute in horses, not only was it impossible to keep the horses alive for long, but they also brought a contagious horse disease into the country. Secondly, the horse should be left entire. And thirdly, a horse should never be used for other work than that to which he was originally trained. The hired horse should never be changed into a beast of burden, nor the hack into a draught horse. If this is done, the animal (so affirms the pig-tailed veterinary surgeon) must shortly die.

That these rules, at least by far the larger part of them, rest purely in the imagination, is proved by the hundreds of Mongolian horses which yearly are taken to Shanghai. The race-course of that place, on which, during a recent week, the spring races took place, has had numberless horses to exhibit that

have gone against all the rules just quoted, without the procedure having bad consequences. On the contrary, nothing should afford to the Chinese horse-trainer a more striking proof of the absurdity of his creed than the magnificent specimens of Mongolian race-horses which have once more just brought to light to what a high standard of perfection the art of the European horse-trainer can bring the Mongolian Rosinante, highly unpromising and insignificant as its original condition was.

THE PHYSICAL CONDITION OF HORSES FOR MILITARY PURPOSES.

BY GEORGE FLEMING, ESQ., C.B., LL.D., F.R.C.V.S., PRINCIPAL VETERINARY SURGEON OF THE ARMY.

(*Continued from page* 46.)

Three-year-old remounts at the Remount Depots receive:—

Oats 6 lbs. 9 ozs.
Hay 10 lbs. 15 ozs.
Straw 13 lbs. 2 ozs.

For three or four months of the year they are put on green food, but the transition to and from this is gradual.

In the French Army there is a similar gradation in the scale of forage ration, according to the arm of the service and the kind of work performed. The Light Cavalry (Infantry officers' horses are included in this category) allowance per horse per diem is—oats about $8\frac{3}{4}$ lbs., hay $8\frac{3}{4}$ lbs., straw $5\frac{3}{4}$ lbs. in garrison; on the march it is 10 lbs. oats, with the same quantity of hay and straw as in garrison; at manœuvres, if the horses are in barracks they receive the same ration of oats as in garrison, with $6\frac{3}{4}$ lbs. hay and about 9 lbs. straw, but if in bivouac then the ration is the same as for the march; while on a war footing it is $10\frac{3}{4}$ lbs. oats, $6\frac{3}{4}$ lbs. hay, and $4\frac{3}{4}$ lbs. straw. The line Cavalry (the horses of Engineer and Infantry officers are on this scale) receive in garrison 10 lbs. oats, $6\frac{3}{4}$ lbs. hay, and 9 lbs. straw; on the march $11\frac{3}{4}$ lbs. oats, and 11 lbs. hay and straw; at manœuvres, if in barracks the ration is the same as in garrison, if in bivouac it is as on the line of march; while on a war footing it is nearly 11 lbs. oats, 9 lbs. hay, and $4\frac{1}{2}$ lbs. straw. The reserve Cavalry includes the horses of the Staff, Intendance, Staff of Artillery, and of Engineers and Auxiliary Transport. The ration in garrison is—oats $11\frac{1}{4}$ lbs., hay 9 lbs., straw 9 lbs.; on the march it is—oats 12 lbs., hay and straw 11 lbs.; on manœuvres, if in barracks it is the same as in garrison, and if in bivouac the same as on the march; on a war footing the allowance of oats is 13 lbs., hay 9 lbs., straw $4\frac{1}{4}$ lbs. For Artillery horses —draught and saddle—the garrison ration is $10\frac{3}{4}$ lbs. oats, hay 9 lbs., straw 9 lbs.; on the march it is 12 lbs. oats, 11 lbs. hay, and the same of straw; on manœuvres, if in barracks it is the same as in garrison, if in bivouac the march allowance is given; the war ration is nearly 13 lbs. oats, 9 lbs. hay, $4\frac{1}{2}$ lbs. straw.

In the Russian Army the daily ration during peace is as follows:—

Guard Cavalry and Artillery, 12 lbs. $7\frac{3}{10}$ ozs. oats, 9 lbs. 1 oz. hay, 3 lbs. 10 ozs. straw.

Line Cavalry, Artillery, and Engineers, 9 lbs. $5\frac{1}{2}$ ozs. oats, and the same hay and straw as above.

Transport Draught, 7 lbs. $12\frac{1}{20}$ ozs. oats, 18 lbs. 2 ozs. hay.

In the regiments and batteries of the Guard, this allowance is given all the year round, but in other corps it is only issued for eleven months, the horses being turned out to grass, and only receive 13 lbs. $9\frac{1}{2}$ ozs. of hay for one month after the manœuvres.

If necessary, barley may be substituted for oats, weight for weight, and hay can replace oats in the proportion of 4 lbs. 8½ ozs. of hay for 3 lbs. 1⅘ ozs. oats. In war, the above rations are issued, with the addition of 3 lbs. 10 ozs. of oats; and in lieu of straw 4 lbs. 8½ ozs. of hay are issued. Thus the forage ration of a Line Cavalry Regiment during war is 12 lbs. 15½ ozs. of oats, and 13 lbs. 9½ ozs. of hay.

From this statement you will see that in the great armies of the Continent, close attention has been paid to the quantity of forage required in each arm of the service, to ensure physical fitness in peace and in war; and you will also gather that in our army this subject has evidently not received the notice it deserves. Our horses are either underfed while they are performing hard work, or they are overfed when this is light; and if the ration is sufficient for large horses, it must be more than sufficient for small ones. I am certainly of opinion that the whole subject of forage for our troop horses needs investigation; and in view of the fact that the allowance is not properly apportioned between light and heavy horses, or with reference to the work done, and that it is generally inferior to that of other European armies, especially that of Germany, I think the time has arrived when this inquiry should be made. In this inquiry the quality of the forage should not be overlooked; the present contract weight of oats is too low and should be altered.

3. Care and Management.

With respect to care and management, I need not say much to you, except to state that in direct proportion as these are attended to, so will the physical fitness of horses be ensured. They comprehend so many details, that it is impossible to deal with them in a brief lecture. Grooming, feeding, shoeing, housing, equipping, working, and all the other points comprised in these terms, are of great moment, and need constant attention in order to their being carried out to the advantage of the horses. Given good horses of the proper kind, and food sufficient in quantity and good in quality, their welfare then depends upon those who attend upon them. Only one thing I would like to refer to before leaving this section, and that is the necessity for inculcating kindness in all who have to do with horses. Physical fitness is closely related to mental fitness; for that horses have minds, affections, and memories no one can deny, and all who have studied them will bear testimony to the effects of ill-treatment and kindness upon them, not only in the performance of their work, but upon their durability. Horses kindly treated will do as much, if not more, service in a given space of time than those which are harshly used; while they will certainly last very much longer. With unfeeling treatment and bad management, horses can be worn out in a very short period; whereas, under the opposite conditions, their lives might be most usefully prolonged to more than twenty years.

Therefore it is that, in order to assist in ensuring the physical fitness of their troopers, soldiers should be continually reminded of the great importance of kindness to their animal friends and companions. Humanity to animals is a sacred duty imposed upon all of us; to the soldier it is this and something more, for his life may depend upon the reciprocal feeling of affection existing between himself and his steed. In the words of the old Cavalry soldier already quoted, "The rider must live only for his horse, which is his legs, his safety, his honour, and his reward." Soldiers should never be deprived of their horses, if possible, if they have taken care of them; but they ought to be encouraged to form a friendship with them, or even to imagine a kind of proprietorship in them. Officers and men should learn as much as they can of the care and management needed to keep their horses in the best condition for work, and how to preserve them from injury.

4. Amount of Work Exacted.

The amount of work which can be safely exacted from horses depends so much upon the points I have already specified, that nothing definite can be said with regard to it. Army horses are more exposed to extremes of toil than other horses, and during active operations hardship is usually added to fatigue—hunger and thirst, exposure to inclement weather, and often more or less serious injuries being superadded. It is under these conditions that the physical fitness of horses is most seriously put to the test; and well it is if this enables them to undergo them without breaking down, or becoming seriously impaired in efficiency at a perilous crisis. It only too often happens that there is no choice during war operations between moderate, heavy, and excessive work, and therefore no rules can be laid down which might be made applicable. What is comparatively easy work for horses in good condition, during favourable weather, and in a country well adapted for movement, would be the opposite for weak horses in an inclement season, and in a heavy country.

5. The Manner in which the Work is Exacted.

Of course, everything should be done to guard against physical unfitness, no matter how severe the duty may be; and it is here that the skill and attention of officers and men are perhaps rendered most conspicuous and beneficial. In performing exactly the same amount of work under the same conditions, one regiment or battery will have its horses in a good state during the whole time, while another will be nearly broken down. This will greatly, if not altogether, depend upon the manner in which the work is exacted, and the amount of care taken of the horses. It is well known that there are horsemen who will get more work out of their horses, and at less expense to them, than others; and that a horse which, with judicious management, will perform a journey of many miles, can be exhausted in a few miles by unwisely urging him. It is not always the amount of work, but the manner in which it is performed, that does the damage.

Therefore it is that, in order to keep horses physically fit for their work, the utmost vigilance, knowledge, and forethought are imperatively necessary on the part of those who are responsible; and the task is not a light one in the field. At no time was it an easy one, and during active operations in the future it is to be apprehended that it will be more onerous than ever it was; it will certainly be no less exacting than it was during the Continental wars in the early part of this century, when a Light Cavalry General enumerated, among other requirements of a good Cavalry Officer, "readiness in judging of the state of health of men and horses; a knowledge of prompt remedies applicable in certain cases; a daily and careful inspection of the saddlery, and detection of the repairs required in it; provision of everything which may be useful to man and horse, without over-weighting the latter; inspection of the equipment and of the repairs required in it; intelligent packing of kit; regularity of pace on the march; good choice of ground for camping, and continuous supervision of everything which may affect the health of the horse there; the teaching of the means by which the services of a farrier may be dispensed with for the time being; . . . watchfulness to prevent useless expenditure of the strength of his horses; to give in all circumstances a personal example, and to give it all the more steadfastly as the situations are more trying and difficult."

For horses which have to move quickly over broken ground, and perhaps at the end of a long march, the greatest consideration is required to keep them ready for all emergencies; and it is to these horses that the foregoing remarks more especially apply. While the greatest attention is being paid to render the fire of Artillery and Infantry more rapid and deadly,

and more extended, are we taking as much care to improve the mobility, the celerity of our Cavalry in proportion, so as to place it on a more equal footing with these now formidable arms? I fear the answer must be in the negative; for while our horses have certainly not improved in quality, as Cavalry horses, from what they were half a century ago, when fire-arms of precision were not known, the loads carried by these horses have not been much, if anything, lessened. Not only have the arms of precision rendered it necessary that physical fitness in endurance and speed should be more than ever considered in our quick moving horses; but the electric telegraph, telephone, and visual signalling have all concurred in demanding greater rapidity of movement from them, if Cavalry is to be a potent factor in warfare. In connection with this point, the question of the weight carried by Cavalry horses is of the most vital importance. There can be no doubt whatever, that for the work which Cavalry should do effectively in the field, the loads they carry are far too great. So far as I can learn, the estimated weight that a Light Cavalry horse should carry is more than 19 stone, allowing the rider to weigh 10 stone; in Heavy Cavalry, the soldier weighing 12 stone, the horse carries more than 21 stone, and this without even a day's forage, which will add at least another stone; and if the weather be wet, saturation will impose yet another stone or two more. Celerity under such enormous loads is impossible; and when to these we have bad weather and scanty or bad forage, with long marches, it is evident that the destruction of the best horses is a matter of a few days; exhaustion must be rapid, and sore backs and crippled limbs inevitable.

There would appear to be a tendency to heap weight on horses' backs, even in mounted corps with carriages, as in the Artillery and Transport.

In the Cavalry, the soldier carries on him 28 lbs. $3\frac{1}{4}$ ozs.; the horse equipment 74 lbs. $3\frac{1}{2}$ ozs.; in wallets 6 lbs. $14\frac{3}{4}$ ozs.; in front of saddle 8 lbs. $1\frac{3}{4}$ ozs.; behind saddle 12 lbs. $13\frac{1}{2}$ ozs.

In the Royal Horse Artillery, the soldier carries 28 lbs. $7\frac{1}{4}$ ozs.; the horse (including harness) 98 lbs. $14\frac{1}{2}$ ozs.; in wallets 8 lbs. $3\frac{3}{4}$ ozs.; in front of saddle 8 lbs. $1\frac{3}{4}$ ozs.

In Slow Draught Corps (Royal Artillery, Royal Engineers, and Army Service Corps), articles on driver weigh 18 lbs. 8 ozs.; harness complete 80 lbs. 8 ozs.; articles on saddle 26 lbs. 8 ozs.; articles in wallets 4 lbs. 8 ozs.

So that in the Royal Horse Artillery the near side horse carries 144 lbs., which, with the weight of the driver (12 stone), amounts to 22 stone, while in a field battery it is 21 stone; and these horses have to draw from 8 to 10 cwt. besides!

These terrible loads could surely be reduced, even if we must consider them as minimum—for it must be remembered there are many men in Cavalry who weigh much more than 12 stone. I have seen men in Light Cavalry who, in stable dress, weighed 16 and 17 stone. It does seem strange indeed, that in corps such as Artillery and Transport, the greater part of the killing load should not be transferred from the horses' backs to the waggons. An ounce on wheels is a pound on the saddle.

And surely the Cavalry loads can be lightened considerably. Is it absolutely necessary that all the articles enumerated in the equipment list be carried on the saddle?

Wheel or pack saddle carriage should be employed to convey everything but what is vitally necessary for man and horse. It is astonishing how little is needed, if men are trained to require little. De Brack, who should have known what was necessary, says, "A valise for Light Cavalry which can hold more than a couple of shirts, a holdall, and under its flap a pair of boots, is not only useless, but really a danger. The fewer articles a soldier has, the greater care he takes of them, the cleaner he is, and the more ready, too.

The Chasseurs of the Imperial Guard went through the whole of the Russian Campaign before my eyes, with a pelisse and a single pair of cloth Hungarian pantaloons." And he adds, "The art of carrying kit lies in three things—1st, to take only what is indispensable; 2nd, to distribute the weight equally, fatiguing the horse as little as possible, and not chafing him; 3rd, to afford the rider the greatest possible facility in managing his horse, and to derive the greatest advantage from its powers. The art of packing is three-fourths of the duties of a Cavalry soldier in the field."

The work of a Cavalry horse is more like that of a hunter than any other description of horse; and we know what a hunter can do, and how he must be treated in order to keep him physically fit. We also know something as to the price of a hunter able to carry 18 stone safely, and if he does two days' hunting in seven, it is usually considered enough; in the meantime, he receives such treatment in the way of housing, feeding, grooming, and other attentions, as the poor troop horse never knows at any time.

It is urgently required that the loads on army horses' backs be diminished to the very lowest possible weight. At no time should it exceed 18 stone, even with the best horses this country can produce; and that army which can muster a lightly equipped Cavalry will certainly have a great advantage over one whose horses are heavier laden.

How reduction of weight is to be effected it is scarcely in my province to say, though I might urge that on the saddle and on the soldier little more should be carried than what is needed for actual conflict, and these articles should be of the very best. Everything else necessary should be carried on wheels or pack saddle.

It may be interesting to glance at the weights carried by Cavalry horses in the armies of other countries, and compare them with those of our own.

France.

According to the Aide Mèmoire of the Staff (edition 1888), the following are the average weights, including the weight of the rider:—

Light Cavalry	19 stone 1 lb.
Dragoons	20 „ 2 „
Cuirassiers	23 „ 10 „

It is added that these weights are increased by 1 stone 8 lbs. after exposure to rain.

A more recent article* in the "Revue de Cavalerie" (May, 1881), gives the following as the result of official trials in several regiments:—

Light Cavalry	17 stone 11 lbs.
Dragoons	18 „ 10 „
Cuirassiers	21 „ 6 „

These weights were made up as follows:—

	Average weight of man.	Average weight of saddlery, etc.
Light Cavalry	9 stone 6 lbs.	8 stone 5 lbs.
Dragoons	10 „ 1 „	8 „ 9 „
Cuirassiers..	11 „ 9 „	9 „ 11 „

I may incidentally mention that the French Light Cavalry horses towards the earlier part of this century carried 112 to 115 kilogrammes, equal to 249 to 254 lbs., or 17 stone 11 lbs. to 18 stone 2 lbs.; being an average of 17 stone 12 lbs.

* Entitled "Trop Lourd."

Italy.

Colonel Slade* gave the following as the weight of Italian Cavalrymen with arms and accoutrements (forage not included) :—

Hussars	16 stone 8 lbs.
Lancers	17 „ 4 „

This month he forwarded the following additional information :—

Light Cavalry.

Average weight of man	10 stone	5½ lbs.
„ „ saddle complete	4 „	6½ „
„ „ carbine and sword		13 „
	15 „	11 „

Lancers.

Weight of man	11 stone	4½ lbs.
„ saddle complete	4 „	6½ „
„ sword, lance, and carbine	1 „	3½ „
	17 „	0½ „

In addition to the above the horse carries 12 lbs. of hay and 8 lbs. of corn.

Colonel Slade adds that the weights given in his report, No. 51, were taken from personal observations, as he had six men of each branch of the Cavalry weighed, and struck an average. They differed a little from the above, which he got from the War Office, and on one point in particular he disagreed, viz., the difference between the individual weight of a Light Cavalryman and a Lancer, as there is certainly not more than 7 lbs., whereas they show it to be 13 lbs.

Belgium.

Particulars of the new light saddle and equipment adopted for the Belgian Cavalry will be found in War Office paper $\frac{0}{3}\frac{1}{0}\frac{4}{6}\frac{0}{}$ with enclosures.

This saddle, designed by General Courtin, when fully equipped for the field weighs :—

3 stone 1 lb.

The weight of corn for the horse and the rider's rations are included.

Germany.

Cuirassier's horse (marching order) carries 23 stone 0·388 lbs.

Man, average	13 stone	5 lbs.
Saddlery and kit	6 „	6·002 „
Clothing and arms	3 „	3·386 „

Hussar's horse (marching order) carries 18 stone 5·554 lbs.

Man	10 stone	3 lbs.
Saddlery and kit	6 „	7·630 „
Clothing and arms	1 „	1·8924 „

Netherlands.

Cavalry horse (marching order) carries 17 stone 12·8 lbs.

Man	10 stone	3 lbs.
Saddlery and kit	5 „	4·8 „
Clothing and arms	2 „	5 „

* In despatch No. 51 of 1888.

SWITZERLAND.

Cavalry horse (marching order) carries 17 stone 5·66 lbs.

Man	10 stone	3 lbs.
Saddlery and kit	5 „	0·05 „
Clothing and arms	2 „	2·61 „

SWEDEN.

Cavalry horse (marching order) carries 19 stone 8.17 lbs.

Man (say)	10 stone	3 lbs.
Saddlery and kit Clothing and arms	9 „	5·17 „

RUSSIA.

The average weight carried by the Cavalry horse is 18 to 20 stone, as follows:—

Saddlery complete with valise and great coat	$8\frac{1}{2}$ lbs.
Clothing and boots	8 „
Linen	$1\frac{3}{4}$ „
Carbine, bayonet, and cartridge pouch	11 „
40 rounds ammunition	$3\frac{1}{2}$ „
Weight of man	$144\frac{1}{2}$ to $180\frac{1}{2}$ „

AUSTRIA.

Service Marching Order.

Dragoons Uhlans	21 stone 3 lbs.
Hussars	20 „ 13 „

The weight of the rider is in each case taken at 11 stone.

I have now concluded my observations on the physical condition or fitness of army horses, but feel that I can have done the subject only scant justice. It is far too extensive for one lecture, but, nevertheless, I trust what I have ventured to bring before you relating to it may be amplified by the remarks of those of you who are in a better position to deal with it than I can pretend to do.

DISCUSSION.

The Chairman: There are several points I should like to touch upon in starting a discussion on this excellent lecture. First, I wish to ask whether the price of army horses has increased within the last fifty years. We know that the last half century has seen enormous changes in everything—railways, for instance, have made very great changes in the habits of the people. Farmers and others, who formerly used horses very much, now go themselves and send their produce by rail, and it stands to reason that this fact alone must have an effect on the breeding of horses. Race horses and hunters have also changed. Things are now faster, and people are in a much greater hurry than they were, and we expect more speed from our horses. I should like to know what effect these changes have had on the prices and quality of horses. The question of care and feeding is another subject that might be discussed. It would be interesting to know how many Cavalry horses are "cast," and how long they last. We have often heard of horses lasting twenty years, and a great many of us may have had horses useful for that time. How long do they last in a Cavalry regiment? What quantity are cast every year, and is the number increasing or not? As regards the change or variation in the ration I should think that would not be a very easy thing to arrange, and the experience of Cavalry officers would help us. It is a matter of importance, because in some stables certain horses eat more than

others, and some are much better if they do not have so much. Mr. Fleming told us that in foreign armies this variation existed, and from the experience of our friends who have been abroad, I should like to ask whether their horses are better than ours—whether reducing the scale has had a good effect on that point I am very doubtful. I was extremely pleased to hear Mr. Fleming speak of the importance of the mobility of Cavalry, because I believe the whole of our thoughts ought to be centred on this point. Cavalry reconnaisance has become far more extended on account of the range of guns and rifles having increased, and therefore there is more than ever necessity for great mobility. In connection with rapidity of movement comes the question of weight. On the subject of weight I wish to ask how much at present concerns the man and how much the horse. As regards the man I am quite certain that the amount carried for his comfort might be reduced. It would be a great advantage to us if our Cavalry horses could carry three or four stone less than at present. I have made these few remarks rather with a view of starting a discussion than giving an opinion of my own.

Colonel Maclean, 1st Dragoons: In speaking of the food of horses Mr. Fleming did not touch on water. Do you not think that good water is a very essential thing? I know that the reason horses do better in some places than in others greatly depends upon the water. Another thing, I think our horses are much too crowded; there are too many horses in one stable, and I think they ought to be fed four or five times a day instead of three. By feeding them at long intervals they are induced to "bolt" their corn, and perhaps one is a more savage feeder than another, and gets part of his neighbour's allowance. I have often seen a horse eat his neighbour's corn before his own, and I think a division might be put between their mangers with advantage. By feeding them more often the corn is properly digested, and it is generally more conducive to good health. I have known sick horses by tempting them with a little bit now and a little bit again look quite different in a month. I also think every Cavalry barracks should be provided with a good horse-power corn-crusher. A great part of the corn is passed by the horses without being masticated at all. They gave us chaff-cutters, and they might give us corn-crushers. I use bruised oats in my private stable always, and find them a great benefit. As to the weight our horses carry, I am of the lecturer's opinion that we ought to get as much as possible off his back and put it on wheels. I am quite certain the amount that horses have to carry is far too much, and I think it might be reduced about two stone. I think the horse is asked to do more than he possibly can.

Lieutenant-General Sir Evelyn Wood: I think in connection with the crushing of corn arises the question of the horses' teeth lasting.

Colonel Morton, Army Remount Department: General Ravenhill asked me to represent the Army Remount Department, and I regret very much that he is not here himself, as he could have answered the question whether the Cavalry horse has or has not deteriorated. I am afraid from my experience I cannot speak practically, but I think it has. When this lecture reaches him, which I have no doubt it will shortly, he will have his views put on paper. He is much interested in the Government commission, and all the steps that are being taken for the improvement of the breed of horses there have not had time yet to show fruit, but will do so in some five or six years, and attention has undoubtedly been turned to the breeding of light-legged horses available for military purposes. There are two things I should like to refer to. First, with regard to the corn-crusher, one objection to it is that you cannot have it on service, at all events. There would certainly be no time then to be crushing oats, to say nothing of carrying corn-crushers, and I think it very materially answers the argument. With regard to the effect of water upon horses, there is no doubt that at some stations horses look far better

than at others owing to different water. As to the weight carried now by Cavalry, I am not able to say what the effect is on service, but in time of peace every one seems trying to load the horses more and more, and a great many fads have had the effect of considerably increasing the weight, but directly men get on service a great part of these are thrown aside. There cannot be the smallest doubt that every effort should be made to decrease the weight at present carried on our Cavalry horses' backs.

Colonel Maclean: I do not see why the horse should not have his corn crushed in time of peace, at any rate. We do many things in time of peace that we do not do in war. (Hear, hear.)

Lieutenant-Colonel R. Athorpe, R.E.: We have some alternative rations on which to feed our troop horses in the Army by which we can vary their feed—grass, carrots, etc., for instance, when they can be got, so that they are not restricted to a hard-and-fast diet of hay and corn. In his comparison with foreign nations the lecturer very properly remarked upon the increased ration for larger and harder-worked horses. When you get horses of a certain size you must put enough into them, or they will not do the work you require of them.

Lieutenant-General Sir Evelyn Wood: Have we been adding much to the weight since the Crimea?

Colonel J. N. Crealock: I think it is about the same.

Lieutenant H. L. Webb, Quartermaster, 1st Dragoons: It is heavier than it was in 1858. We have more ammunition than in former times, and signalling instruments, pioneer equipment, picketing gear, breast harness, etc., to carry, which we did not have before.

Sir Evelyn Wood: But those things only affect some three or four per cent. of horses, and do not affect the general question.

Lieutenant H. L. Webb: Nevertheless the Cavalryman is more generally weighted. His necessaries and clothing have not been reduced, but rather increased, and some articles are heavier; for instance, his Wellington boots were used for riding, now the Cavalry soldier has a pair of knee boots in addition, which weigh 6½lb.

Sir Evelyn Wood: I quite admit the pioneer tools affect a few horses, but, on the whole, we have been taking off weight generally.

Inspecting Veterinary-Surgeon W. B. Walters: I think that one of the principal causes of deterioration in the quality of our Army horses may, in a great measure, be attributed to the presence of foreign buyers in our markets. I know, from personal experience, that under the old regimental system of purchasing it was frequently a matter of great difficulty to procure young horses of the right stamp in sufficient numbers, owing to the fact that at every important fair in Ireland agents were actively employed in buying for Continental armies the very animals that we required for our own, and at prices considerably above our limit. This will probably explain the reason why a better class of Cavalry remounts could be bought thirty years ago for £25 than can now be purchased for £40. As regards the question of oat crushing, I am certainly in favour of it, and consider ten pounds of crushed oats to be nearly equal, in feeding quality, to twelve pounds of whole oats. Of course, it may not always be possible to supply crushed grain; for instance, on active service in the field. Yet I see no reason why it should not be issued on all practicable occasions. We ought to neglect nothing in order to keep our horses in the highest degree of health and vigour, and to prepare them for any emergency that may arise. We may be sure that if we had our animals in an enemy's country in good hard condition, they will go through a campaign very much better than if landed in a state of comparative poverty. (Applause.)

Major W. G. Knox, R.H.A.: I quite agree with what Colonel Maclean says

about the horses being cramped and crowded in stables. I have one troop stable with fifty-eight stalls in it, and have to put fifty-eight horses in it. This handicaps stable management, as there is no room to humour "tricky" horses. Warmth is another thing that should be attended to, and doors and windows made to fit a little better; but, perhaps, this is an Engineer's question. As to the deterioration of horses for army service, I think it is only a question of price. I believe the horses exist, and I remember in 1878, when we were raised to war strength, and the price raised £10, we never were better horsed in the Horse Artillery. I think the question of not buying docked horses cramps our military market very much. For draught purposes a docked horse is much preferable, as we all know. The lecturer is not quite correct in his figures regarding the weight of a driver in the R.H.A., nor in the weight behind the team. Few drivers stripped weigh more than 10 stone, and the weight behind the team is now 7 cwt. per horse, which we in the R.H.A. consider 1 cwt. too much for mobility.

Major A. O. Green, R.E.: I think it is a good thing that doors and windows do not fit too closely, for I have often found the stables a little stuffy. (Laughter.) My experience is that horses do very well in the open, and do not require to be coddled.

Mr. J. Kettle, Veterinary Surgeon: They require ventilation, but no draught.

Major Knox: I think if the fashion of docking horses were to go out it would remove a defect.

Colonel Maclean: I cannot possibly think that foreign horses are better than ours. I have seen some miserable-looking animals.

Colonel Crealock: A German officer saw the horses of the Royal Dragoons, and he remarked that he never saw the like.

The Chairman: There is a friend of ours present who has travelled on the Continent who will, perhaps, contribute to the discussion.

Inspecting Veterinary-Surgeon J. D. Lambert: I do not agree with the opinion that our army horses have deteriorated, and I speak from the experience of nearly thirty-two years' service, very many of them spent in the Cavalry. I think that our army horses are as good as they ever were, and superior to those of any other country. I have seen all the great Continental armies, except the Russian, and during my visits to the different countries paid great attention, as a military veterinary surgeon, to the quality of their horses. I was always obliged to come to the conclusion that our horses are much superior to those of any other army. But besides being conscious of this fact ourselves, foreign governments recognise it too, and all, without exception, show this by constantly employing agents to buy our horses, and especially mares, because their great aim and object is to raise the quality of their horses to our own excellent standard. I beg, therefore, to urge that we may be confident that our horses of the present day will not, speaking generally, suffer by comparison with those of any former period. When we consider the great and beneficial efforts now being made by the Royal Agricultural Society, the Hunters' Improvement Society, and others, as well as the encouragement given by Parliament, we may rest assured that our horses will still maintain their superiority over those of all other countries.

Major F. W. Campbell, R.A.: Small horses, well bred, will do more work than big coarse horses, which require so much food.

Mr. F. Smith, Veterinary Surgeon, Professor Army Veterinary School: The horses in France are decidedly inferior to our own; moreover, their condition and stable management is bad. In Germany I had an opportunity of seeing regiments which had just returned from some severe manœuvres. I unhesitatingly state that the condition of their animals and their general

fitness for work was vastly superior to what our horses would be if they had undergone the same trial and severe exertion. I do not attribute this to any superiority on the part of the horses themselves, but to something in the German system of management. I was especially struck by the absence of sore backs, in spite of heavy weights, and the great freedom from sickness and lameness; the absence of sore backs is due, amongst other causes, to their system of saddling, which is superior to ours. The question of the crushing weight carried by Cavalry horses is one of serious importance, and, perhaps, worse than all is, that the terrible weights have to be carried on a saddle which is decidedly bad. We must remember that the question of weights and sore backs go hand in hand; if we are to keep backs in serviceable condition, not only must we reduce the weight carried, but the fitting of saddles must be carried out in a scientific manner, based on an intelligent knowledge of the structure and conformation of a horse's back, a knowledge which, I do not hesitate in saying, is far from being generally shown at present. I am satisfied that there are comparatively few officers who have any idea how saddles should be fitted to avoid the various injuries to which backs, sides, and withers are liable, and it is in these very cases that, so far as my experience goes, the fitting and alterations are left to irresponsible subordinates. If officers were taught the conformation and structure of a horse's back, how to recognise the cause of even the slightest abrasion under the saddle, and what alterations to make in order to avoid a continuance of the same, I am satisfied that we would have a considerable reduction in the number of cases of sore back which occur as soon as an army takes the field. The subject of corn-crushers has been mentioned this evening; no one, I think, will deny their value, but I am afraid they would go the way of most chaff-cutters, and be always out of order. The extra labour imposed on the men in using these machines is the cause of their being so often out of repair. Feeding horses four or five times a day would be an advantage. I do not think regulations would prevent it; it is a question for commanding officers to settle. It means, of course, much more work for the men.

Lieutenant-Colonel T. Burnett, R.H.A.: I can bear out what Dr. Fleming tells us as regards the necessity of having a scale of food for horses of different sizes. Every officer commanding a battery of Artillery knows that a 16-2 gun leader requires more food than a 15-2 detachment horse, and divides the forage accordingly. This has always been the custom in my regiment. 2 lbs. oats extra for draught horses would help us very much. I confess I am much surprised at a statement I have just heard that the stuffing of the panels of saddles is confided to the care of an "orderly corporal." I cannot imagine such a practice being permitted for a moment in my regiment or battery, and certainly never heard of it until now.

The Lecturer: I came here not to instruct, but to be instructed; and in introducing the various matters I looked forward to receiving information. I am not disappointed, though several important points have not been so fully dealt with as I should have liked. The water is, of course, an important matter, but we are obliged to take it as we get it, so that we cannot go far into its discussion. On the general question with regard to the management of horses—I only incidentally alluded to the food and water. With regard to the feeding, I think there can be very little doubt we feed the horses unreasonably. We give to all horses very much the same allowance of food, though some do not perform the same amount of work. I think we should feed them not only according to their size, but according to the work they do. At some Cavalry stations horses do not require so much food in winter, and I remember when we used to save a quantity of the winter's oats for the summer drills. It is not very satisfactory when you have to take from one

horse in a troop to give to another. I think there should be a generally recognised scale for the feeding—a scale for large, medium-sized, and small horses; also a scale for hard work and a scale for light work. This is perfectly reasonable, and I cannot see why it has not been adopted before. With regard to the quantity of oats and hay which should be given, it should be remembered that hay is bulky food, and contains much less work-yielding power than oats. The work of a Cavalry horse is similar to that of a hunter, and you know how to feed a hunter. Therefore, the food of a Cavalry horse should be approximately the same. The next question was with regard to the crushing of oats. Crushed oats are decidedly advantageous, not only on the score of economy, but also on that of digestibility; and whenever possible they should be given in preference to whole oats, especially to Cavalry horses, as they are more quickly masticated and digested, and there is no waste. In a paper which I shall read at the United Service Institution I intend to insist on the oats being, as far as possible, crushed, and on the establishment of proper centres for the crushing of oats. I have long looked upon it as a bad system indeed to feed our horses on the contract system. The Government should do it, and it would be better for ourselves and for the public. Crushed oats are far better for an animal when his digestion is weak after a hard day's work. I also intend to insist upon the supply of oats and hay sent into the field being prepared and compressed, and that they should not be fed out of the present nose-bags, which rest on the ground and wear out in a short time, and which waste the food. If a horizontal nose-bag is used it never reaches the ground, and the horse can get to the bottom of it, and if the hay is chopped it can be mixed conveniently with the oats. Of course, it would be impossible on service to crush and compress oats; this must be done at home. We know what takes place with regard to the haycutters. Hay should be prepared by the Government. With regard to the weight on the horses' backs, it has been, I think, very materially increased. If the weight had been the same in the Crimea, I do not understand how the horses could have moved. I cannot conceive how horses, weighted as at present, would be able to carry this weight on active service, nor how we can expect them to carry 19, 20, or even 23 stone on a long day's march, and perhaps do a gallop at the end of it. It cannot be done. If we had a war on our hands next month, or in two months' time, we should be extremely hard pushed to get Cavalry horses for it. Therefore it is highly necessary that we should take care of the horses. Every ounce possible should be taken off their backs and put on wheels. Just as you lighten the horse, so you will have him less liable to develop a sore back, break down in the limbs, or succumb to fatigue. The chief cause of sore backs is badly-fitting saddles, for if you have a badly-fitting saddle, a sore back will surely come with a pressure of 20 stone, and even with well-fitting saddles, if the weight is great, the pressure damages the skin, and that results in a sore back. Taking the average weight of the men of a regiment is fallacious, for as the speed of a regiment depends upon the slowest horse, so should the weight of a regiment rather be calculated upon its heaviest man. Then something was said about docked horses. If you dock a horse you deprive him of nature's protection against flies. If the troop horse has to stand in the open air in summer he must have his natural tail. If it is too short for him to reach his flanks with it, he will be kept in perpetual agony by the flies. It is absolutely essential, if you would keep horses in health and good condition in summer, that you should not cut off their tails. Then as to the quality of horses. I am afraid we have a very large percentage of under-bred draught horses in the service. An under-bred horse is not the horse for work; he soon gives in when severely tested. Horses for Cavalry purposes require breeding, and the better bred they are, the better will they meet the requirements of active

service. Just as you are now striving to give the Infantry the best rifle in the world, so should it be your desire to mount the Cavalryman on the best possible horse. (Applause.) I maintain that £5 saved in a troop horse is very bad economy indeed for the country; and as we breed the best horses I do not see why we should not have the best mounted Cavalry in Europe. (Applause.) Our horses are not so good as they might be, and many might conclude that they are not so good or so durable as they formerly were. I am extremely gratified to find the Lieutenant-General Commanding and so many officers taking such great interest in this subject, and assisting us in the consideration of this important question regarding army horses.

Colonel Crealock: I may say that the forage contract system does not exist here.

The Lecturer: I believe this station is an exception, but it exists everywhere else.

The Chairman: I am extremely pleased to hear the opinion that our horses of to-day are even as good as they were. It is very gratifying considering the tendency which exists to depreciate everything of the present. Of the various points which have been discussed I cannot conceive anything more important than the weight on the horse. This greatly depends upon the amount of clothing and other articles carried. I should like to see a new order of parade. I should like to see a "fighting order" parade, where everything is as light as possible, and the movements of troops made with the greatest possible speed. (Applause.) I think it would be a great advantage to all branches if we had a "fighting order" parade. The only point which occurs to me as being of prime importance as affecting the supply of horses is the docking of the tails. I think there should be an Act of Parliament forbidding horses' tails being docked. (Hear, hear.) I think it is a most ridiculous custom, and in addition to the look of the thing being ridiculous it is very cruel if the horses have to be used in summer. If Sir Frederick FitzWygram were to take the matter up, he would have our support in taking any step he might think proper in the House of Parliament. Allow me, Mr. Fleming, to thank you on behalf of the Military Society for this, one of the most interesting of all the interesting lectures which we have had. (Loud applause.)

Reviews.

The Physiology of the Domestic Animals. By R. M. Smith, A.M., M.D. (Philadelphia and London: F. A. Davis. 1889.)

It is very remarkable that until now no work on the physiology of the domestic animals has appeared in the English language, though Continental countries, and particularly France and Germany, have been in possession of excellent treatises for a long time. The reason probably lies in the fact that our profession has not produced a physiologist, the instruction of veterinary students in that department of medical science having been delegated to members of the sister profession. This is a matter for regret, as these gentlemen, though quite competent to teach the elements of general physiology, yet could not claim, perhaps, such a perfect acquaintance with the special physiology of the animals veterinary surgeons have to deal with as is necessary for our graduates.

Dr. Meade Smith has generously and courageously volunteered to fill up the regrettable void in our instructional literature, by giving us a text-book which is, we venture to assert, second to none of the con-

tinental works on the subject, and which will put our students in possession of what they have so long been in urgent need of. Though not belonging to our profession, Dr. Meade has been lecturing on physiology in the veterinary department of the University of Pennsylvania; and recognising the serious disadvantage under which his students laboured in being compelled to rely solely on the notes they were able to take during the lectures, he set himself the somewhat heavy task of placing them in as favourable a position in this respect as medical students. Hitherto, the only available treatises have been those on general and human physiology. Thanks to the author, recourse to these is no longer necessary.

The work, which is voluminous (consisting of more than nine hundred pages), follows the usual plan in having one part devoted to general physiology, and another to special physiology. Each of these parts is dealt with in much detail, and the information given is quite up to date; while the language employed is clear and concise, the descriptions being enhanced by excellent wood-cuts (more than four hundred in number) and diagrams. Too much praise can scarcely be awarded for the manner in which the book has been produced; all previous writers on animal physiology have been consulted, the works of Colin, Munk Bruckmüller, Gurlt, Müller, Thanhoffer, Ellenberger, and others having been laid under contribution; while the typography and general get-up of the volume are in every way creditable. In the special part we should have been gratified to see some allusion to the physiology of the horse's foot, an organ of more importance in the veterinary student's studies than the eye or the ear. But this omission may be remedied in a second edition, which should soon be demanded. In the meantime, there is every reason to be thankful for the boon which Dr. Meade has conferred upon the veterinary profession, and we take this early opportunity of expressing our indebtedness to him, while cordially recommending his text-book for recognition and acceptance as a classical treatise on a most important subject.

Hog Cholera: Its History, Nature, and Treatment. By D. E. Salmon, D.V.S. (Washington: Government Printing Office. 1889.)

This is one of the valuable publications issued from time to time by what is termed the Bureau of Animal Industry, a section of the United States Department of Agriculture which confers great benefits by the investigations it undertakes, of animal diseases and other matters more or less closely related to agrarian pursuits. The work has been produced by the eminent veterinarian, Dr. Salmon, who has particularly distinguished himself as a most intelligent and indefatigable investigator of the wide-spread contagious and destructive malady generally known as Swine Plague, Swine Fever, and Hog Cholera, in which he was the first to demonstrate that pigeons could be rendered refractory to Hog-Cholera poison by previous inoculation with sterilised culture-liquid containing the germs of that disease. (See Veterinary Journal for last July, page 6.) Everything pertaining to the scourge is elaborately dealt with,

and the addition of sixteen capital plates adds greatly to the value of the monograph, which is certainly the very best on the subject in any language. The investigations and experiments cover a long period, and throw much light on this plague of swine. It appears that the investigations, in which several persons were employed, were latterly so systematised as to produce the most satisfactory results. In 1885, a motile bacillus was discovered to be the active agent in causing the malady, and its prominent characteristics were then described. In 1886, the production of immunity by chemical products was demonstrated, the effect of disinfectants on the contagium was thoroughly studied, and the presence of another epizoötic disease of the porcine family, to which the author gives the designation of "Swine Plague," was notified. These discoveries, Salmon states, solve the most important problems connected with swine epizooties, and give a secure scientific basis from which to work in future; and he asserts that these diseases are now much better understood than are most of the contagious disorders of mankind; while the measures applicable to their prevention, in the present condition of science, are equally as apparent as are those required for human plagues.

Salmon remarks that, owing to the fact that there are recognised at the present time three distinct infectious diseases of swine in different parts of Europe and America, it is impossible to state whether the disorder known as Swine Fever in this country represents two distinct maladies —Hog Cholera and Swine Plague, or Hog Cholera alone. This question, he is of opinion, can only be solved by a thorough bacteriological investigation, such as has not been made in very recent years; though he thinks there is enough evidence to warrant the statement that this Hog Cholera is prevalent in the United Kingdom; but, he adds, there is, on the other hand, no experimental basis for the statement that the Swine Plague also exists here. He says that the two diseases produce lesions of the large intestine so easily confounded with each other, that great care must be observed in making a diagnosis. He also considers that the three well-marked swine diseases now known as Hog Cholera, Swine Plague, and *Rouget*, were only a few years ago regarded as one malady and designated by several names; and even to-day no clear idea exists among most pathologists as to what the precise differences between these diseases are.

Salmon does not regard the symptoms of Hog Cholera as entirely characteristic, owing to the many forms the disease may assume; and also, owing to the difficulty experienced in making careful thermometric and other clinical observations on pigs, the course of the disease cannot be easily determined. It is regarded as manifesting itself in an acute and chronic form. In the acute form the animals die very suddenly, the illness only lasting from a few hours to a day; while in the chronic form it may continue from three weeks to several months. The animals become stupid and dull, refuse to eat, and generally separate themselves from the others. Weakness ensues, and the movements become feeble and tottering. A common symptom is diarrhœa, which may appear very soon after the animal becomes unwell, and continue

until it succumbs. In protracted cases the liver is sometimes affected secondarily, through the impaired condition of the large intestine.

To show how little dependence can be placed upon symptoms in forming a diagnosis during life, the following general description is furnished from notes taken at the experimental establishment. "The temperature of healthy pigs ranges between 101° and 101½° Fahr. With sick animals it may rise from 1° to 3° above the temperature observed in health. Frequently this elevation is absent. During an outbreak, elevation of temperature may be considered diagnostic, but absence of such elevation proves nothing, since an animal may die without having shown any rise of temperature during the disease. There is rarely any cold or shivering stage. The sick animals are dumpish, spiritless, and lie quietly in a corner, or huddle together, hiding the head under the litter. They refuse to move, even when disturbed, and are more or less oblivious to surroundings. There is more or less loss of appetite. They usually continue to eat a little, however, and often the appetite is rarely impaired during the whole course of the disease. Acute cases may be seen feeding before they are found dead an hour or so later. In most cases the stomach is well filled after death. The bowels may be costive at the outset, or continue apparently normal for some time; or they soon become costive, and remain so, in some cases throughout the disease. In the later stages, diarrhœa of a liquid, fœtid character appears in many cases. The colour of the discharges depends largely upon the feed. In slop or garbage-fed pigs, they are usually of a dirty black colour. In those fed with grain, they are light yellowish. The diarrhœa persists until death. Vomiting is absent.

"Respiration is only occasionally quickened and laboured in the latter stages. The pulse is more rapid than in health, but its determination is unsatisfactory, owing to the struggles of the animal when held. Cough is infrequent, and then only heard when the animals are aroused, as a single effort or in paroxysms. The skin is frequently found reddened on the nose, abdomen, inside of limbs, the ears, and over the pubic region. The redness is diffuse, varying from a slight blush to a deep bluish-red or purple. It increases as death approaches, and is usually found at the autopsy. A skin eruption appears occasionally, which is followed by crusts or scabs of varying size. Reddening of the skin is a symptom common to the other swine diseases, *Rouget* and Swine Plague. The eyes are apt to be watery. This is frequently the first outward sign. Later, the discharge becomes thick, yellowish, often gumming the lids together. Towards the end of the disease the animals have a gaunt appearance, with arched back and staring coat. Emaciation is very rapid. The weakness manifests itself in a staggering, uncertain gait, as if the animal were about to fall. Death ensues quietly; rarely convulsive kicking is observed. The mortality is very high; usually from 80 to 90 per cent. of those attacked die. The symptoms vary in intensity, and only a certain number are seen in one animal at the same time. In very chronic cases only the autopsy enabled us to make a diagnosis."

With regard to the lesions produced by the disease, these are well exhibited in the eight plates which form a portion of the illustrations, while the letterpress describes them as follows:—"*a. The Acute type.* This might with equal propriety be called the hæmorrhagic type, inasmuch as the chief, and perhaps the only changes are hæmorrhagic in character; and these lesions are seen most clearly when an animal is examined immediately after death. The spleen is invariably enlarged, soft, gorged with blood. Sometimes it is twice as long as the normal spleen (the other dimensions being proportionately increased), and it may extend across the median line to the right side. Next to the spleen, the lymphatic glands and serous membranes are most severely involved. The cortex shows, on section, as a hæmorrhagic line or band, according to the amount of extravasated blood, or the entire gland may be infiltrated with it. Among the glands most commonly hæmorrhagic are those of the meso-colon (large intestine), those at the root of the lungs (bronchial), and on the posterior thoracic aorta. Besides these, the retro-peritoneal and gastric glands (lesser omentum) may be involved. Most rarely the mesenteric glands show extravasations to a slight extent. Hæmorrhages are also quite frequent beneath the serous surfaces of abdomen and thorax. They are most abundant under the serosa of the large and small intestines as petechiæ and larger patches. They are occasionally found under the peritoneum near the kidneys, the diaphragm, the costal pleura, as extravasations nearly an inch across. The lungs, in a small percentage of cases, show subpleural ecchymoses in large numbers, and, on section, small hæmorrhagic foci are observed throughout the lung tissue. In a few cases severe hæmorrhages, involving one or more lobes, have been observed. The kidneys are occasionally the seat of extensive hæmorrhagic changes. The glomeruli appear as blood-red points; larger extravasations occur in the medullary substance, and blood may collect around the apices of the papillæ. The subcutaneous tissue over the ventral surface of the body may be dotted with petechiæ, and occasionally collections of blood (hæmatomata) are found in the superficial muscular tissue. The brain and spinal cord have not been examined for want of time. In one case, however, in which they were laid bare, petechiæ were seen on the cerebellum. The digestive tract usually is the seat of extensive lesions. The fundus of the stomach is, as a rule, deeply reddened; there may be more or less hæmorrhage on the surface, giving rise to patches or larger sheets of blood-clots. The small intestine, in some cases, has submucous ecchymoses throughout its entire length. In the large intestine the ecchymoses may be so numerous as to give the membrane a dark-red appearance. The food is now and then found incased in sheets of blood-clot, due to hæmorrhage on the surface.

"*b. The Chronic form* is perhaps the most common, at least in those epizooties which we have studied. The acute hæmorrhagic cases usually die in the beginning of an outbreak, and are apt to be overlooked. Following these are the more protracted, milder cases. In these animals the disease is apt to be limited, in its severe manifestations, to the large intestine. The other organs, however, are not

exempt from degenerative changes, owing, in part, to the impairment of the functions of the large intestine, consequent fermentations, and the absorption of poisons thereby produced; in part to the presence of the specific bacteria in the spleen, and presumably in other organs where they exercise their poisonous activity.

"The lesions of the large intestines are necrotic and ulcerative in character. The ulcers may be isolated and appear as circular, slightly projecting masses, stained yellow or blackish, or both, in alternate rings; or they may be slightly depressed and somewhat ragged in outline. When the superficial slough is scraped away, many ulcers show a greyish or whitish bottom. A vertical section reveals a rather firm neoplastic growth, extending usually to the inner muscular coat. When sections of such ulcers are stained with aniline dyes, and are examined under the microscope, we notice the submucous tissue very much thickened, infiltrated with round cells, and containing a large number of dilated vessels. Resting upon this thickened submucosa is a line of very deeply-stained amorphous matter, and upon this is situated the necrotic mass, which fails to retain the colouring matter, and is penetrated by an immense number of bacteria of various kinds. Frequently ova of the *tricocephalus* are imbedded in the slough. The extent of the submucous infiltration depends upon the age of the ulcer. In old ulcers it contains many newly-formed capillaries, and evidences of the formation of connective tissue are present. The capillaries may extend to the very edge of the border where the slough begins. The latter may have been partly shed, leaving a smooth line bounding the cicatricial tissue. The submucous infiltration gradually disappears as we leave the centre of the ulcer, and somewhat outside of the ulcer no inflammation of the membrane is observable. Giant cells may be seen, in some cases, in the intertubular tissue at the edge of the ulcer. In very young ulcers it is frequently possible to observe the fundi of the tubules intact, while the inner or free half is converted into an amorphous mass. The depth to which the infiltration extends is not always limited to the submucosa; it may extend into the muscular coats and cause inflammatory thickening there, and inflammation and the formation of new vessels in the subjacent serosa.

"In some cases the necrosis, instead of appearing in circumscribed ulcers from one-sixteenth to one-half inch or more across, involves the whole surface of the mucosa, giving it the appearance of a so-called diphtheritic membrane. In such cases the walls of the intestine are very much thickened, and so friable as to be easily torn with the forceps in handling. Such necrosis is rare in spontaneous cases, but it quite invariably appears in animals which have been fed with pure cultures of Hog-cholera bacilli. The distribution of the ulcers varies but slightly. They appear most frequently in the cæcum and on the ileo-cæcal valve, as well as in the upper half of the colon. The lower half is implicated in severe cases only, and then less extensively. The rectum is only very rarely ulcerated. The lower portion of the ileum is ulcerated in a small percentage of animals, especially when they have been fed with Hog-cholera viscera or cultures. The stomach is occasionally the seat

of slight ulceration. The lymphatic glands of the affected intestine are usually much enlarged, pale, tough, whitish on section. The spleen is rarely enlarged ; the liver shows degenerative changes (softening of the parenchyma, increase of connective tissue). Heart and lungs are usually normal. The lobular Pneumonia frequently found in young pigs in the winter months must be ascribed primarily to exposure rather than to the disease.

"In some outbreaks the acute and the chronic types of the disease are not so clearly distinct as in the foregoing pages. Frequently, recent hæmorrhagic lesions seem to be grafted upon cases presenting extensive ulcerations, which certainly are much older than the extravasations. It may be that the latter are the result of a secondary invasion of the Hog-cholera virus, either from the ulcers in the intestine, or from without."

The disease is quite distinct from human Typhoid, and is more allied to Dysentery : anatomically Hog-cholera and Diphtheritic Dysentery are very much alike. The bacillus of the Swine disorder is fatal to mice, rabbits, guinea-pigs, and pigeons, when subcutaneously inoculated. The disease has never been known to be transferred to mankind.

The most common sources and channels of infection are shown to be : *a.* Pigs purchased from infected herds, or coming in contact with those from infected farms, or running over grounds occupied by diseased swine within two or three months ; *b.* Infected streams may communicate the disease to herds below the source of infection ; *c.* Virus may be carried in feed, implements, and on the feet and clothing of persons from infected herds and premises ; *d.* Winds, insects, birds, and various animals may transport the virus.

The preventive and suppressive measures Salmon proposes are based on this knowledge of its extension.

We have dealt thus lengthily with the work before us, because the disease in question is of such a serious character in this country, and the more light that is thrown upon it so the more likely is it to be quickly and effectively combated. And now we have to congratulate our American *confrère* on having given us a most valuable treatise on the subject, and to acknowledge the successful result of his long and patient investigations, conducted with so much skill and enthusiasm.

THE DISEASES AND DISORDERS OF THE OX. By GEORGE and Dr. ALFRED GRESSWELL. (London : W. H. Allen and Co. 1889.)

This is another popular work on the diseases of cattle, chiefly, with some mention of those peculiar to sheep. In several respects the book differs from those on the same subject which have preceded it, especially with regard to the philosophical spirit which pervades it, and the attempt to treat of the bovine and ovine disorders from a comparative pathologist's point of view. The authors inform us that to their brothers in the veterinary profession is due some of the information the work contains, but that very much of it has been derived from their father, "the late Mr. Alderman Dan Gresswell, F.R.C.V.S., whose long and honourable connection with Science, as one of her most persevering, enthusiastic, and successful votaries is known throughout the world."

Though intended for agriculturists, the book may be consulted with profit by veterinary surgeons, as it contains much that is original, while that which is familiar is written in a very attractive style. There are nearly one hundred woodcuts and four plates to illustrate the verbal descriptions, and altogether the work deserves praise as another addition to the list of useful books intended to promote the welfare of agriculture and the wellbeing of valuable animals.

Proceedings of Veterinary Medical Societies, &c.

ROYAL COLLEGE OF VETERINARY SURGEONS.

QUARTERLY MEETING OF COUNCIL, HELD JULY 1ST, 1889.

Professor J. W. AXE, President, in the chair.

Present: Sir Frederick Fitzwygram, Professors Williams, Brown, Walley, Duguid, Pritchard; Messrs. J. D. Barford, E. C. Dray, H. Kidd, W. Wilson, Wragg, Woods, J. F. Simpson, T. Greaves, W. Whittle, W. Hunting, J. Roalfe Cox, J. D. Lambert, T. Briggs, W. F. Mulvey; Mr. G. Thatcher, Solicitor; and Mr. A. W. Hill, Secretary.

The SECRETARY announced that letters expressing regret at inability to attend had been received from Dr. George Fleming, Professor McCall, Sir Henry Simpson, and Messrs. Taylor and Perrins.

The SECRETARY announced that the following presentations had been made to the library: work on "The Tropical Diseases of the Horse," by William Burke, Army Veterinary Department; and "The Annual Statistical and General Report of the Army Veterinary Department," by Dr. George Fleming.

Mr. DRAY proposed a vote of thanks to Dr. Fleming and Mr. Burke.

Mr. WOODS seconded the motion, which was unanimously agreed to.

The SECRETARY read a letter from Dr. McBride with regard to an application on behalf of his brother, who has gone abroad, for a certificate in lieu of lost diploma.

Mr. J. F. SIMPSON thought that the Council should not merely accept the written statement of a gentleman to the effect that he had lost his diploma. Dr. McBride should pursue the ordinary course of making a proper declaration before a Commissioner or a magistrate, before the Council could think of entertaining his proposal.

The letter was ordered to be laid upon the table.

Report of Finance Committee.

Mr. DRAY proposed that the report of the Finance Committee should be taken as read, and that the Council should sanction the drawing of cheques to meet the liabilities of the current year.

Professsor WALLEY seconded the motion, which was agreed to.

Report of Registration Committee.

On this report and the recommendations contained therein coming up for discussion, it was discovered that a quorum of members was not present to deal with the case of Charles Lawrence, so that the matter stood over until a quorum could be obtained.

Professor WALLEY proposed the adoption of the report of the Registration Committee, with the exception of the recommendation with regard to the case of Charles Lawrence.

Report of General Purposes Committee.

Mr. WRAGG moved the adoption of the report.

Professor WALLEY seconded the motion.

Mr. GREAVES inquired whether the Secretary had received any communication from Mr. Carlisle with reference to his portrait.

The SECRETARY said that no communication had been received.

Mr. GREAVES suggested that the portrait of Mr. Carlisle should be received and hung in the library.

Mr. HUNTING was of opinion that it would be a more graceful act on the part of the Council to let the matter stand as it was. It would be an extremely ungraceful thing on the part of the Council to tack any rider on to the resolution of the Committee.

Mr. SIMPSON said he had had an interview with the donors of the portrait, and he had ascertained that it would be quite in accordance with their wishes that the matter should be settled at once, and the portrait hung in the library.

Mr. WILSON thought the General Purposes Committee should have the power of selecting the most suitable position. If the report of the Commitee were adopted all that was necessary would be done.

The report was then adopted.

Report of Committee appointed to consider the question of recognition of Colonial and Foreign Colleges.

The PRESIDENT stated that in accordance with the Veterinary Surgeons' Act of 1881 it was necessaary that the Royal College of Veterinary Surgeons should recognise certain schools whose graduates it might deem to possess the requisite knowledge and skill for the purpose of practising the veterinary art. Four applications had already been made, two from the Bombay School, one from Ontario, and the other from Victoria. The Council had received a diploma from some, but of course it was no guide whatever as to the period of study, which the graduates in those schools had passed through, nor was it any indication of the nature and extent of education to which they had been submitted. It was quite impossible therefore for the Committee to take any further steps at the present time, but they had suggested that the Secretary should be instructed to write to the various colonial and foreign schools to obtain prospectuses with a view of determining the nature and extent of the education which they afforded to their graduates, and the period of study through which they passed. It was a very important question, inasmuch as soon as they recognised a school they would be compelled to recognise graduates of that school on the payment of a sum not exceeding five guineas as a registration fee. It would then be competent for such graduates of foreign and colonial schools to enter into competition with them in this country as practitioners of the veterinary art. The Committee did not see their way clear to make any suggestion at present, but as soon as they had obtained prospectuses of the various schools they could determine their respective merits, and so would be in a position to recommend to the Council what schools should be recognised in the future.

Mr. WILSON moved the adoption of the report of the Committee.

Mr. DRAY seconded the motion, which was agreed to.

Report of the Court of Examiners.

Professor WALLEY wished to ask one or two questions. He said that the Final Examination was divided into two sections, the Oral and the Practical, and if a student gained three "goods" or "very goods" in the Oral and failed to gain similar marks in the Practical, or *vice versa*, those marks were not

allowed to be placed on record in either of those parts against his name. He thought that was hardly in accordance with the spirit of the giving of honours. He considered that if a student passed the Oral Examination with great credit it should be recorded against him without any reference to the two parts, and the same in reference to the Practical part.

Professor PRITCHARD totally disagreed with the remarks of Professor Walley. He thought it would be straining a point if a man by his ability obtained great credit, or very great credit, in his Oral and failed in his Practical, to say that it was a double examination.

Professor WILLIAMS said that the whole subject wanted reconsideration. He thought that honours should be given to the men who had passed in all the subjects from the beginning with a majority of good marks.

Mr. WILSON said that now the question had been raised, it seemed to him that the other examinations wanted a little consideration as well as the Final. He thought the matter should be referred to some other, say the Bye-laws Committee, to consider the whole question.

Professor WALLEY said that if it was the wish of the meeting he would refer the whole matter to a small committee.

Mr. WILSON thought it was too much to expect a young man in the limited space of seven months to master such sciences as chemistry, botany, and anatomy. He would like to propose that a committee should be formed for the purpose of considering the present condition of their examinations generally.

Mr. SIMPSON asked how the marks of honour were arrived at by the examiners in the C Examination.

Professor WALLEY: By the biggest record in the Oral.

The PRESIDENT inquired whether it was a fact that the examiners in the Oral did not confer with those in the Practical as to the marks which the student should receive on completing his examination.

Professor WALLEY said there was not the slightest consultation whatever.

The PRESIDENT read the bye-law on that point, which is as follows:—"That the Final Examining Board shall consist of two sections, the first to conduct the Oral, and the second the Practical; and that their awards be disjoined."

Mr. SIMPSON thought the attention of the Examining Board should be called to that bye-law.

Professor WILLIAMS proposed, "That the examiners in Class C be instructed to confer honour or credit on all students who obtain a majority of 'very good' or 'good' marks in either section of the examination."

Mr. SIMPSON seconded the proposition.

Professor PRITCHARD moved as an amendment, "That no pupil be awarded honours who fails to pass either section of Class C Examination."

Mr. HUNTING seconded the amendment.

Sir F. FITZWYGRAM did not understand whether it was intended that if a student gained honours in the Oral and failed in the Practical, but subsequently passed his Practical well and satisfactorily, he should be credited with passing in honours.

Mr. WILSON was strongly of opinion that the word "successful" should be inserted in the resolution.

Professor DUGUID maintained that the examiners should not give their awards; that it should be an instruction to the Secretary and not to the examiners.

Some further discussion took place, at the close of which

Professor WILLIAMS proposed his amended resolution as follows; "That the Secretary of the Examining Board in Class C Examination be instructed to record honour or credit upon all successful students who have obtained

a majority of 'good' or 'very good' marks in both sections of the examination."

Professor WALLEY seconded the resolution.

Mr. HUNTING proposed as an amendment, "That the giving of credit marks to students at all examinations be left to the examiners as before."

The amendment was put to the meeting and declared carried, eight voting in its favour and seven against.

Consideration of Case of Charles Lawrence.

There being a quorum of members now present the Council went into the consideration of the case of Mr. Charles Lawrence.

The SECRETARY explained that as there was not a quorum at the last Council meeting the case could not then be considered. It was now brought up again under the following circumstances: Mr. Charles Lawrence had been summoned before the Registration Committee to show cause why his name should not be struck off the Register. He had pleaded guilty to the charge of embezzlement. After due consideration, the Committee recommended to the Council that his name should be removed from the Register under the Veterinary Act, and that his attention should be called to Clause 7 of the Act giving power for the restoration of names to the Register.

Mr. THATCHER read the notice of conviction, dated the 29th of April, 1887, of Charles Lawrence, on a charge of embezzling the sum of £10.

Mr. BARFORD moved the adoption of the report of the Registration Committee, so far as the case of Charles Lawrence was concerned.

Mr. KIDD seconded the motion.

The clauses of the Veterinary Surgeons' Act, 1881, dealing with the matter of the motion, was put from the chair and passed, twenty-two members voting in its favour.

Report from the Court of Examiners for the Fellowship Degree.

The SECRETARY announced that the following gentlemen had passed the Fellowship degree on the 24th of April last:—Messrs. J. E. Peele, J. G. Parr, G. J. Pickering, R. C. Irving, and D. M. Storrar.

Appointment of Examiners for the Fellowship Degree.

Mr. SIMPSON moved the re-appointment of the present examiners.

Mr. J. R. COX seconded the motion.

Mr. DRAY suggested that Mr. Cox's name be added.

Mr. COX, in declining, said he much preferred the examining body should stand as before.

The resolution was agreed to.

Appointment of Committees for the Year.

Mr. J. R. COX said he desired, in view of any inconvenience that might arise, that his name should not be associated with the committees about to be appointed. He had heard of late the insinuation and suggestion that the profession had now become dissatisfied with what had been termed the dual appointment—the office of examiner and the membership of the Council—in other words, that the honour of being examiner was now considered to render the individual undesirable to assist the Council for the advance, honour, and welfare of the profession. If that proposition was tenable, the sooner the better should men be sought who could be trusted honourably to perform the functions of the two responsibilities. In furtherance of his desire to serve their cause as best he might, he had endeavoured to inform himself to what extent the views that had been urged were the views of a very considerable and important part of the profession. He found that on the occasion of his

being elected to office there were something less than 700 members who voted, and that of that number between 500 and 600 paid him the high compliment to invite his services again on the Council, knowing very well that he was on the Examining Board. He could not but consider that he should be breaking faith with a very great majority of the profession if he were to resign. It was his duty to stick to the ship. He took it that those of their members who exercised their right to assist in the appointment of members of the Council, and who took the trouble to record their vote, were representatives of the profession. At the same time it would be a matter of satisfaction to him to be the first to bow to the wishes of the profession, and to leave a seat on the Council vacant. He desired also to say that he was sorry to see that the question of the regrettable errors enacted at Edinburgh had again been revived in print. It was a pity that that matter had not been allowed to remain in oblivion, but as it was revived in print, some action must come from the Council. It was to the lasting regret of all the members of the Examining Board at that time, that in opposition to the desires and to the strict order of the Council, its solicitations and challenge were glossed over. That solicita tion and challenge was that there should be such a strict investigation as should probe to the bottom and unearth the root of all that had been at fault. At that time the Council was in correspondence with the Lord Provost of Edinburgh. The official communication from the Council was to urge two enquiries. It was further to propose a scheme by which a perfectly impartial investigation should take place, and to this day the official document remained unanswered, and to this day the College was under the ban of disrespect and discourtesy—some called it insult—in the ignoring of its communications.

Parliamentary Committee.

Mr. SIMPSON moved the re-appointment of the Committee of last year, with the addition of the names of Messrs. Lambert and P. Taylor.

Mr. WILSON seconded the resolution, which was agreed to.

General Purposes Committee.

Mr. MULVEY moved that it be as last year, with the addition of Messrs. Woods and Taylor.

Mr. WRAGG proposed Mr. Hunting and Professor Pritchard, and the resolution, with the additions, was agreed to.

Registration Committee.

Mr. MULVEY moved that it be as last year, with the addition of Professor Pritchard, Messrs. Perrins, Taylor, and Lambert.

The resolution was agreed to.

Bye Laws Committee.

Mr. MULVEY moved that it be as last year, with the addition of Sir H. Simpson, Professor Pritchard, and Mr. Kidd.

Mr. WRAGG proposed Mr. Hunting,

The resolution, with the additions, was agreed to.

Finance Committee.

Mr. DRAY moved that it be as last year, with the addition of Professor Pritchard, Dr. Fleming, Mr. Briggs, and Mr. Taylor.

The resolution was agreed to.

Dinner Committee.

This Committee was re-appointed, with the addition of the names of Professor Pritchard, Mr. Lambert, and Mr. Hunting.

Committee appointed to consider the question of the recognition of Colonial and Foreign Colleges.

Mr. SIMPSON moved that it be as last year, with the addition of the names of Mr. Hunting and Mr. Lambert.

The resolution was agreed to.

Mr. MULVEY moved that the names of the Council and of the members of committees be printed and circulated.

The resolution was agreed to.

Notices of Motion.

Mr. WILSON gave notice of the following motion for the next meeting:—"That section 2, p. 61, be amended thus, by striking out the first sentence and substituting in lieu thereof:—'Students who do not produce one or other of the certificates referred to, shall be examined by a Board of Examiners appointed by and under the direction and supervision of this College, to whom they shall report the result of the examinations, which shall be uniform and applicable to the whole of Great Britain.'"

Mr. BRIGGS said that at the next quarterly meeting of the Council it was his intention to bring forward for discussion the subject of instituting a written examination in addition to the present Oral and Practical Examinations.

Professor WALLEY announced that at the next quarterly meeting he would move that the present percentage of marks, viz., thirty, should be raised to fifty.

Mr. HUNTING announced that he would move a resolution at the next meeting that every candidate for the diploma should produce a certificate of birth before being put on the list.

Surplus Funds.

Sir F. FITZWYGRAM suggested that some of the surplus funds of the College should be expended on putting down a wooden pavement in front of their building in Red Lion Square. The cost would, he understood, be about £300.

Professor WALLEY suggested that in the matter of surplus funds the Council should take into consideration the foundation of scholarships for veterinary students.

SPECIAL MEETING.

The meeting was then made special to consider the undermentioned notice of motion by Professor Brown:

"In line 5 leave out the words 'be allowed to.' In line 6 leave out all the words after 'Practical,' and all the other lines of the paragraph to the end, and add 'He may present himself at any succeeding Practical Examination which may be held during a period of three years from the time of his rejection."

Professor BROWN, in moving the above resolution, said that the effect of it would be that a student who had been rejected at the Oral Examination would do exactly what he pleased, as now, in reference to going back to the College, or going with a member of the Royal College of Veterinary Surgeons; but if he took the latter course he would not be compelled to return to the College for one month previous to the next examination. That part of the law had operated very unsatisfactorily. He therefore proposed that it should stand in this way—that in the event of a student being rejected at his first Practical Examination he might present himself at any succeeding Practical Examination which might be held during a period of three years from the time of his rejection.

Professor WILLIAMS seconded the resolution.

Mr. SIMPSON would like to take the opinion of the members as to the advisability of adopting the course proposed. It seemed to him that the resolution, if passed, would give to the principals of the schools power to say to the students, "You have failed to pass your Practical Examination, and we have done with you; we have no more to do with you; put yourselves in communication with the Royal College of Veterinary Surgeons, throw the responsibility upon them of advising you when your Practical Examination takes place, and take your chance of passing." But so long as they had honourable men like they were at present they need have no fear of that, but he ventured to think that such a time would come. He, therefore, would like to hear the opinions of some other members of the Council as to what they might consider the right course to adopt; and whether they would allow the teaching institutions to say to the student, "It is no business of ours to educate you up to the standard of the Practical Examination. Pass your Oral and we have done with you; go and get your practical knowlege where you will."

Professor WALLEY ventured to suggest that in the event of a change taking place in the heads of the establishment the Council would certainly have sufficient notice to prevent anything of the kind suggested by Mr. Simpson from taking place. It was an easy matter to alter a bye-law at any time.

Professor Brown's resolution was then put and carried.

A vote of thanks to the Chairman terminated the meeting.

SPECIAL MEETING OF THE COUNCIL, HELD JULY 10TH, 1889.

Professor J. WORTLEY AXE, President in the chair.

Present:—Professors G. T. Brown, W. Duguid, W. Pritchard; General Sir Frederick Fitzwygram; Dr. George Fleming; Messrs. J. Roalfe Cox, W. Mulvey, H. R. Perrins, F. W. Wragg, W. Wilson; Mr. George Thatcher, Solicitor, and the Secretary.

The SECRETARY read the notice convening the meeting.

The SECRETARY stated that he had received letters from Professor Walley, Messrs. Briggs, Kidd, and Woods, regretting their inability to attend the meeting.

On the motion of Professor PRITCHARD, seconded by Mr. WILSON, the minutes of the previous meeting were taken as read and confirmed.

The PRESIDENT said that the meeting had been called to confirm the undermentioned alteration of Regulation 7 for the Professional Examinations proposed by Professor Brown, and carried at a special meeting of the Council held on the 1st of July, 1889:—"In line 5 leave out the words 'be allowed to.' In line 6 leave out all the words after 'practical,' and all the other lines of the paragraph to the end, and add 'He may present himself at any succeeding Practical Examination which may be held during a period of three years from the time of his rejection.'" He begged to propose that the resolution as passed at the last meeting be confirmed.

Mr. WRAGG seconded the motion, which was carried unanimously.

General Sir FREDERICK FITZWYGRAM said that there was one point he should like to bring before the meeting. A great deal of confusion seemed to arise from one examination being called the "Oral" and the other being called the "Practical." Both examinations were oral, and he thought it would be advantageous to change the name of the first examination, namely, the Oral, to "the Theoretical Examination," and the other "the Practical." It was true that the gentlemen sitting round the table understood that the Oral Examination meant the Theoretical, and that the Practical meant what

it expressed, and he did not think the term "Oral" Examination conveyed a very clear idea, and the change in that name, therefore, would be advantageous.

The PRESIDENT suggested that perhaps General Sir Frederick Fitzwygram would bring the matter forward at a future meeting.

General Sir FREDERICK FITZWYGRAM said he simply wished to throw out a suggestion in order that it might be taken into consideration, and he would hand in a notice of motion at the next quarterly meeting.

The proceedings then terminated with a vote of thanks to the President.

CENTRAL VETERINARY MEDICAL SOCIETY.

AN ordinary general meeting of this Society was held at the First Avenue Hotel, Holborn, on July 4th, 1889. In the unavoidable absence of the President, the senior Vice-President, Mr. Frank Wragg, occupied the chair.

A letter was read from Mr. H. Brown, Jun., tendering his resignation, which was accepted with regret.

The HONORARY SECRETARY read the Report of the Special Committee on "The Education and Examination of Veterinary Students." The resolutions adopted by the Committee were as follows: 1. "That the matriculation examination should be of a uniform standard for all schools, and of a more stringent character than at present;" 2. "That a separate table be established in Materia Medica and Therapeutics at the Final Examination;" 3. "That Hygiene be included as a special subject for examination;" 4. "That the existing 'A' Examination be merged into that of 'B';" 5. "That a written examination be added to the oral;" 6. "That if a written examination be adopted the questions asked be subsequently published."

The Report having been received, Mr. RAYMOND expressed his regret at being unable to adopt Mr. Hunting's scheme of two examinations only, instead of three. His chief reason was that he considered it unfair to expect a student to have at his finger ends, for the momentous forty minutes of the examination, such a mass of information as is represented by Anatomy, Chemistry, Physiology, Botany, and Hygiene; and he asserted most strongly that if the examination was at all searching it is too much to expect from any student. Rightly or wrongly, it is said on all hands that students are now below par, and that a very low percentage of correct answers will procure a pass. If this be true, how can one expect to improve the state of affairs by concentration? If the average student is weak when examined on two or three subjects, how is he to be stronger if taken on five or six, even with a little more time? He pointed out that the extra time given "cuts both ways," for it is possible to forget a good deal during a six months' run in the country. He would put himself in the position of a student, and as such he should much prefer the three exams. to two. A large section of Mr. Hunting's supporters were entertaining a well-founded fear that the profession is greatly overcrowded, and welcomed any scheme which would be likely to exercise a check; as Mr. Hunting says, "We have no special desire for the influx of new recruits." Now we have a perfect right to prevent overcrowding, if we can do so by fair means; but the profession should not forget that it owes a duty to the public aud to young men who enter as students, and neither are likely to submit to our checking the supply of veterinary surgeons by sharp practice. But a great many of Mr. Hunting's supporters go even farther, and demand that the exams. should also be made more stringent; so it comes to this, the student who is said to be hardly able to blunder through two subjects when leniently treated is to be allowed a periodical run at grass, in order that he may get out of gear and forget as much as possible of what he has learnt; he is then to be examined on five or six instead of two or three subjects, and the exam. is to be made much

more stringent. If the Council should adopt this idea he was afraid the students and the public would treat us to clamour of the Edinburgh sort, and the examiners would have to eat dirt, or, in other words, the standard would be quickly lowered and the object of the profession defeated. There is a good deal of talk about cramming, but really there is no examination passed without cramming, unless it be when a horse is examined for soundness. The problem the profession desires to have solved is, How is the efficiency of the student to be increased? how is over-crowding to be prevented? He feared the question of over-crowding was far more difficult to answer than the other. He considered the time was rapidly approaching when the tinkering system will have to be dropped, and the question of efficiency boldly faced. The fact is that our profession has made such rapid strides that it is gaining popularity amongst a more numerous and higher social class. The most casual observer could see this if he would only visit Camden Town. Many members of this class were not so accustomed to animals as they ought to be, and they therefore experienced more difficulty at starting in practice. On the other hand, they are better provided with means to go through a lengthy curriculum. The suggestions which he would offer were based on the above, and were, Raise the entrance fee to the schools (the Melbourne College fee is £105). It is all very well to talk of the poor man, but those who desire the profession to rise must endeavour to get hold of the best material to work on, and where it is a question of rising socially the man with some means will have the better chance. In fact, the increased demands of the public require higher proficiency, and therefore longer study, and longer study entails more expense. Raising the school fees will thus tend to procure a better class of man. Secondly, make the preliminary examination more stringent. When he (Mr. Raymond) entered, and propably the same obtained now, it was a mere farce. Some of the more advanced of the professors are in favour of this measure, and recently Professor MacFadyean pointed out that the Council should have remedied this before. Thirdly, make the curriculum longer, say four years, as in France and elsewhere. Fourthly, make the practical examination very stringent, and include equitation up to riding a quiet horse over a hurdle. These measures should come into force, say, five or seven years hence, so that no one may suffer by the innovation. Mr. Raymond, continuing, said it seemed to him that all these items were perfectly fair, and if adopted would help to prevent over-crowding, at the same time raise the standard of the profession to a higher level. The fourth resolution, which he objected to, was really a plausible dodge to make things more difficult at the examination tables, and thus to check the flow of men into the profession. He was convinced that we should have to come to the measures he had suggested sooner or later, and the sooner our minds were made up the better for all concerned. In conclusion, Mr. Raymond proposed, "That the fourth resolution of the Committee's Report be referred to the Committee for revision." In reply to the Chairman, Mr. Raymond said he approved of all the resolutions of the Committee except the fourth. He wished to emphasise this, as it had been reported in the professional journals that he was adverse to the adoption of written examinations, whereas he personally thought such an innovation would be most beneficial.

Mr. WRIGHT seconded Mr. Raymond's proposition, fully agreeing with the remarks that gentleman had made, except that instead of an examination in equitation, he would have one in practical dispensing.

Professor PRITCHARD considered that instead of submitting the Report to the Royal College of Veterinary Surgeons, it should be presented to the principals of the schools, as it had solely to do with the education of the students.

Mr. ROWE anticipated that if it were sent to the Royal Veterinary College it would be simply laid on one side; he felt that it had been altogether a waste of time by the Committee, and he was not sorry that he had not personally taken a more active part.

Mr. HURNDALL said the Committee had some little confidence that their report would be courteously received, but he considered it should be presented to the Council of the Royal College of Veterinary Surgeons; if the Council, which was the head of the profession, gave an opinion on the subjects the schools would follow in its wake. He was certainly not disposed to allow Mr. Raymond's motion to pass unchallenged, and to save time he proposed as an amendment, "That the Report be adopted as it stands."

Mr. ROWE was more inclined to support the Report as read than to support Mr. Raymond's views. To double the fees was to rob the parents of the students, but he could not cordially second the adoption of the Report, because he objected to its first clause. He considered the standard of education at present demanded from young men entering on their professional studies quite sufficient, and he would move, as a further amendment, "That clause 1 of the Report be expunged."

Mr. HURNDALL considered the first clause of quite as much importance as any other, and he could not personally accept Mr. Rowe's amendment, for he wanted to see men entering the colleges who had made good use of their time at school; such men were well prepared to take in the subjects they would have to study, and such would also be able to take a more prominent position in society.

Mr. WRIGHT asked Mr. Hurndall if he wished the Matriculation Examination to be on a par with that of the medical schools. Mr. Hurndall replied that it was very desirable that they should be more alike than at present.

Mr. ROGERS cordially seconded Mr. Hurndall's resolution that the Report be adopted as it stood. Mr. Rowe's amendment was not seconded, and the original amendment was carried.

Mr. HURNDALL considered that the Report should be preceded by a summary of the course the Society had adopted from the commencement in this matter.

Mr. RAYMOND suggested it should be referred to the Committee to consider what should be done with the Report.

Professor PRITCHARD again expressed his opinion that it should be sent to the principals of the schools.

The HONORARY SECRETARY thought there would be a difficulty in getting another Committee meeting as was suggested, for its members had already given a great deal of time, and had thoroughly considered the Report, and he begged to move, "That the resolutions as suggested by the Committee and approved at that meeting be presented to the President and Council of the Royal College of Veterinary Surgeons."

Mr. WRAGG said that was no doubt the intention of the Society when it appointed the Committee, and of the Committee when it considered the subject.

Mr. HURNDALL seconded the Secretary's proposition, which was carried.

The CHAIRMAN suggested the Report should take the form of a memorial, which was agreed to.

Mr. RAYMOND thought the whole of the supporters of the resolutions should form a deputation to present the Report, but subsequently proposed, "That the mover and seconder of the resolution, together with the President of the Society, should draw up the memorial and present it to the Council." This was agreed to.

A vote of thanks was accorded the Chairman.

SIDNEY VILLAR, *Hon. Sec.*

A NEW VETERINARY SOCIETY.

A MEETING was held on July 5th, at the North-eastern Ho'el, Darlington, when it was decided to form a new Association, to be named the South Durham and North Yorkshire Veterinary Medical Association, the meetings of which are to be held quarterly, and the annual subscription be 10s. 6d.

Seventeen members were enrolled, and the following officers were elected, viz.—

President . .	Mr. J. Nettelton, Northallerton.
Vice-Presidents	Mr. G. T. Pickering, York. Mr. J. G. Deans, Bishop Auckland.
Treasurer . .	Mr. F. R. Stevens, Darlington.
Secretary . .	Mr. W. Awde, Stockton-on-Tees.
Auditors . .	Mr. G. E. Nash, Richmond. Mr. H. Gelsthorpe, Darlington.

Messrs. Stevens, Gelsthorpe, Briggs, Nash, and the Secretary were appointed a committee to draw up the Rules.

It is expected that the first regular meeting will be held in the first week of September, when the President will deliver his inaugural address, etc.

ROYAL SOCIETY FOR THE PREVENTION OF CRUELTY TO ANIMALS.

THE sixty-fifth anniversary of this Society took place on June 27th, the first meeting being held in the forenoon, the President, Lord Aberdare, in the chair. After the Annual Report had been read, and the first resolution passed, Dr. FLEMING, Principal Veterinary Surgeon of the Army, proposed the second resolution. He said, I have very great pleasure in moving the resolution put into my hands, which refers to the presentation of a gold medal to Professor Walley. It affords me much gratification to be associated with this motion, because Professor Walley has been the head and front of the scientific agitation in his own country, as well as in England and Ireland, against the barbarous practice of dishorning. For a great number of years he has laboured in law courts, at meetings, and in the press, and assisted this Society materially in gaining a great achievement, which has been alluded to to-day by the speakers who have preceded me, and described in our Report at great length. I am the better able to say this knowing the work Professor Walley has done, and representing to some extent the profession to which he belongs. Undoubtedly, the judges' decision is one of the greatest and most far-reaching victories we have ever obtained; for their judgments will be, I hope, of great use, and serve as a precedent to the action of the Society in other forms of cruelty, which might be termed "fashionable cruelties." Some ten or twelve years ago, at a meeting of the National Veterinary Congress of this country over which I had the honour to preside, many cruel practices were discussed and condemned. Among these was the custom of dishorning cattle, and I can assure you that that meeting was unanimous as to the abominable cruelty attending the practice. I therefore think the acknowledgment of Professor Walley's services which you propose to make to-day (and in this I am sure the Professor would agree with me) should be regarded as a compliment paid to the whole veterinary profession, which I may claim has been a good friend to the Society and to its cause, the protection of animals. Veterinarians understand better than the ordinary public what pain is to dumb animals, and it is their mission to reduce it to the lowest limits—in fact, their work is one long endeavour to assist the Society in its most sacred objects. As I have already mentioned, I hope the opinion of the judges will form a great precedent for future work by the

Society, which must not relax its crusade against all cruelty. There are other forms of cruelty, at present backed up by a certain section of public opinion, but these, though not so glaring as dishorning, have to be suppressed. The docking of horses was alluded to by Mr. Justice Hawkins in a remarkable way. I am enabled, owing to my position in the Army, to see the great evils of this custom. We often have to buy horses so mutilated. Army horses suffer terribly from this disfigurement. They have to stand out in the open for many hours during the hot weather, and the torture they experience from flies is very severe. Thus you see there is not only the actual pain at the time of mutilation, and for a long time after, but the operation deprives the animals of their most important defence against insects. I beg to lay this good resolution before you:—

"That the gold medal of this Society be presented by her Grace the Duchess of Westminster, at the meeting to be held at St. James's Hall this afternoon, to Professor Walley, in recognition of the great services he has rendered to the cause of the Society, and notably by his able and persistent opposition to the practice of dishorning cattle."

I am sure my friend Professor Walley will receive this acknowledgment with the greatest pleasure he has ever experienced.

Mr. F. D. MOCATTA: I wish it had fallen to some one with more power than myself to give expression to the value of this resolution. It is quite true that we owe much to the veterinary profession, and it is also true, although Dr. Fleming would not tell you so, that we owe a great debt of gratitude to himself personally, to Professor Pritchard and others, for the immense assistance they have rendered and are always happy to render us. Although we are guided by our excellent Secretary, who makes our objects the study of his life, yet without the help of the veterinary profession our judgments would want force before magistrates. There is no doubt veterinary surgeons have been our mainstay, and their support invaluable to us from the first. We have often been accused of pressing hard on poor people, depending for their livelihood perhaps on the labour of a single animal, while ladies and gentlemen of high position escape scot free. This I may say at once is a groundless charge, for it is one of the great glories of this Society, which can be proved beyond question, that we are not respecters of persons, that we endeavour to use influence with our Government for the purpose of making salutary and impartial laws for the benefit of dumb animals, and in counteracting cruel practices which have nothing to recommend them but the base idea of making a little additional gain. In regard to this latter point, as has been already explained to you with great ability, our veterinary friends have stood us in good stead; and if any one living deserves the gold medal it is the gentleman who has laboured so hard and persistently, side by side with us, to eradicate the barbarous custom of dishorning cattle. Unfortunately a large amount of cruelty still prevails in our midst, despite the officers of the Society. I do not mean to decry them. Their duties are arduous enough, for there is hardly a market, or fair, or street, or stable but which is under the eyes of this institution. The value of this surveillance cannot be measured simply by the number of offenders actually punished. Cruelly disposed people know that they are being watched, and this tends obviously to the benefit of the animals under their charge. I think most persons who have to be out late at nights during the season must have noted the marked improvement in the condition of the night cab horses. The animals now to be seen at such work compare very favourably with those horribly disfigured creatures, only to be urged on by the frequent use of the whip, which we recollect in the days of our youth, to our lasting disgrace. As a great traveller, especially through Europe, I have noticed the superiority of England over every other country as regards the question of humanity. I am proud

of this, but I should like to see other nations making greater strides in the same direction. Still, we have much to be thankful for, this Society having exercised a most beneficent influence in the countries around us. In Germany the cause is spreading rapidly, I believe, while in France it is improving, and even in Spain it is beginning to be felt. I do not think we can say much about Russia, though our Secretary says there are two societies in that country. In Norway and Sweden the movement exists, and is likely to advance. Thus there is a marked improvement all over Europe. We must not forget that foreign societies are not favoured in the same manner as ours are here; but there is a gradually growing public opinion abroad on this subject which must tend to support our objects. In America they have made great headway—in fact, they are on a par with ourselves, and from what I can understand a laudable competition exists between the two branches of the Anglo-Saxon race. People who are old enough to remember this Society from the beginning must have noticed what a remarkable change has taken place since then in the treatment of animals, and I doubt not those who live fifty years hence will be not less surprised at the benighted condition of their ancestors of to-day. I have much pleasure in seconding the motion.

The PRESIDENT: I dare say you would like to know something of the history of this gold medal. Some years ago Her Majesty the Queen suggested that the Society should institute a gold medal, in order to bestow it on the most conspicuous workers in our cause. We did not undertake, as is sometimes done, to award one of these every year, because it often happens under these circumstances that you have to look out for a man on whom to confer the distinction, but we hold it in our hands to give it when well deserved. Our Patron is the Queen, and the medal, before it was issued, was submitted to Her Majesty, who was graciously pleased to examine it, and remarked that although it contained the figures of a good number of animals, yet the cat was not included, an animal which was the subject of a great deal of active and thoughtless cruelty. Another suggestion which fell from Her Majesty was that the first medal ought to be bestowed on Mr. Colam, who had laboured so hard in the interests of the Society. Since then there have only been two other medals awarded, and these were in acknowledgment of invaluable services rendered to us by very eminent men in the veterinary profession, namely, Dr. Fleming and Professor Pritchard. This, therefore, is only the fourth medal that has been issued by the Society.

The resolution was carried unanimously.

At the second meeting, held in the afternoon, the Duchess of Westminster distributed the general prizes awarded by the Society. Previous to this the noble PRESIDENT said, Before proceeding as usual, there is a special ceremony of an interesting character to be performed. At our meeting this morning we came to the resolution to ask the Duchess of Westminster to be kind enough to present the gold medal awarded by the Society to Professor Walley, for the eminent services he has rendered our cause over a long series of years, and especially during a recent important trial. Some years ago the Society decided to institute a gold medal, which was only intended for presentation to those who had performed distinguished services in aid of our objects. These medals are not granted as a matter of course every year; indeed, the present medal is only the fourth that has been issued. The first was presented to our Secretary, Mr. Colam, on the suggestion of Her Majesty the Queen, and the others have been won by eminent members of the veterinary profession, without whose assistance it would have been absolutely impossible for the Society to have achieved what it has. The second medal was conferred on Dr. Fleming, the next on Professor Pritchard, and now we propose to bestow

the fourth on Professor Walley in accordance with the resolution I have referred to.

Her Grace the Duchess of Westminster having presented the medal—

Professor WALLEY said, When I received from Mr. Colam, a few days ago, a note intimating that it was the desire of the executive of the Royal Society for the Prevention of Cruelty to Animals to confer on me the distinction of a gold medal, I felt very much astonished, and not a little gratified. I was not aware at the time that any such recognition was ever given to any person in this country for services rendered in connection with cruelty to animals. At the same time, I candidly confess I looked upon it as a very great honour, and I do so now more than ever, when I find that only three persons have preceded me as recipients of this rare distinction. I can only thank the members of the Society very heartily for their handsome acknowledgment of services which I look upon as no more than a duty incumbent on me. Those who are placed in high positions, and who have opportunities of seeing what cruelty to animals means, ought to do their best to mitigate the sufferings of their dumb fellow creatures. Special knowledge involves, or should do so, special duties on every individual. I hold that it is the duty of the veterinary profession to come forward and assist in putting down anything like cruelty to animals. I accept this honour, your Grace, as a token that this Society regards the veterinary profession with esteem, and I receive it far more on its behalf than as an acknowledgment of any special merit of my own. I note in your Report with pleasure that one of the great objects of the Society is to prevent cruelty by teaching. I have always held that you can do more by teaching persons what is cruelty than by prosecution. In connection with this matter of dishorning, my object has been to educate people to do away with such a cruel practice. In a large portion of Scotland the efforts of this Society, and of kindred societies, have been very successful; for whereas a year or two ago cattle would have had their horns cut off close to their heads, now they are only called upon to suffer to a limited extent by having the tips removed. I am sorry to see in the sister isle the practice is carried on to a large extent. However, I do not despair that our united efforts will in time lessen the evil, if they do not some day overcome it entirely.

Army Veterinary Department.

Gazette, July 5th.

ARTILLERY VOLUNTEERS, 2ND WEST RIDING OF YORKSHIRE.—Parlane Walker, gentleman, to be Veterinary Surgeon.

Gazette, July 12th.

DITTO, FIRST WORCESTER.—Henry Margetts Stanley, gentleman, to be Veterinary Surgeon.

Veterinary Surgeon Finlayson has embarked for a tour of service in Egypt, *vice* T. A. Mitchell, who is invalided from that country to England.

Obituary.

THE following deaths have been reported :—

T. W. Jordan, M.R.C.V.S., Tenterden, Kent,	graduated in	...	1873
F. W. Plumbly, North Walsingham	,, ...	...	1870
G. Philp, St. Andrews, Fife	,, ...		1872-1880

Notes and News.

Mad Dogs in London.—The Chief Commissioner of the Metropolitan Police, in his monthly report to the Home Secretary with regard to the seizure of stray or ferocious dogs during last June, reports that no fewer than 1,530 dogs for whom no owners could be found were seized and sent to the Dogs' Home at Battersea; 55 dogs were killed in the streets—36 by the police, and 19 by private persons. An examination of these by veterinary surgeons showed that 18 suffered from rabies, 13 from epilepsy, 3 from convulsions, 1 from gastritic fits, 6 disease not discovered, 1 not examined, 3 ferocious or mad; whilst 1 dog died from rabies at the Dogs' Home. No fewer than 144 persons were bitten by dogs during the month.

Destruction by Wild Animals.—The deaths by snake-bites in the North-west Provinces of India last year were 6,000. In Madras 10,096 cattle were killed by wild animals, and the loss of human life by snakes and wild animals was 1,642.

An Unusual Instance of Longevity in the Horse.—The following instance of protracted longevity is given by the *Echo Vétérinaire*. After the long war with France in the early part of this century, a certain number of thoroughbred English horses were sent to the Hanoverian cavalry, and among these was one which had served in the 3rd Regiment of Dragoons since 1793. This horse had gone through the campaign in Spain and Portugal during seven years, and was present at the battle of Waterloo in 1815. In 1816 it was transferred to the Hussars of the Guard, in which regiment it remained until 1847, when it was made a pensioner. At the battle of Gracien-Homandez, Spain, it was ridden by Colonel Von Arentschild. It died in 1850, when more than sixty years old, and it had never been wounded, notwithstanding the many battles in which it had played a part.

Horse-flesh Consumption in Paris.—The enormous quantity of 120,037,618 pounds of horse-flesh was consumed as human food in Paris between July 6th, 1866, and January 1st, 1889. Our authority for this is M. Decroix, in the *Revue des Sciences Naturelles Appliquées*. He gets his information from the returns that have been regularly published by the administration. But we are wrong in calling it horse-flesh, for the 266,312 horses in the returns did not make up the full quantity of flesh mentioned; it includes also the carcasses of 8,971 asses and 677 mules.

The Origin of Domestic Animals.—In studying zoological distribution the range of the domestic animals is not to be taken into consideration, for man has been so long engaged in scattering them over the world that it is now impossible to trace their original homes. Indeed, any attempt to assign them to wild progenitors must to a large extent be simply guess-work. The tame cattle of our farmyards and fields may perhaps be sprung from the Urus and other wild oxen which at one time roamed through the vast forests of Europe, and the sty-living pig from the fierce swine which still hold their own in many parts of the Continent and in the thickets of northern Africa. In like manner, the cat is supposed to be descended from a Persian ancestor, and the various dogs of different barbarous tribes can with some confidence be considered merely the tamed wolves, foxes, or jackals of the regions which they inhabit. The ass is evidently a civilised form of the wild ass of Abyssinia, *Asinus tæniopus*, but it is doubtful whether we have yet made any progress in the search after the progenitors of the horse and the camel. No doubt, a so-called wild horse has been found in Central Asia, and wild camels are not infrequent in the same region. But whether these animals

are not tame species which have escaped from domestication long ago and re-established their freedom is a question to which a favourable answer might quite as readily be given as to the contrary thesis. The turkey, it is certain, came from America, the peacock is an Indian bird, and the guinea-fowl was originally from Africa. The domestic goose is regarded as descended from the greylog, or common wild goose, though all the species are capable of domestication; while the duck in our ponds is, in its wild state, known as the mallard. But the domestic fowl has been so long the servant of man that it is now mere speculation to assign to its progenitor any exact home, the Bankiva fowl of Java and other islands of Malaysia having no better claim to this distinction than the jungle fowl of India, which for a time was proclaimed as the barbarous ancestor of the farm-yard hen. Much the same remarks may be made regarding the honey bee, the silkworm, and the Mexican cochineal; for though they have all been traced to wild forms, they have been kept so long under the control of man that their exact origin is either lost or at best doubtful.—*Our Earth and its Story.*

ANTIRABIC INOCULATIONS.—Within the last few years M. Galtier, of the Lyons Veterinary School, has shown by his experiments on herbivorous animals that, even after they have been bitten a certain time, they may be rendered refractory to Rabies by venous injections of rabid virus. MM. Nocard and Roux have also employed this method. It may be applied to all ruminating animals and to pigs; it has the merit of being simple and easy. The virus may be obtained from the animal which has inflicted the bite. The nerve-substance is dissolved in water, and filtered in order to eliminate the solid particles. M. Galtier has made several successful inoculations this year. In February he vaccinated two ewes. They were submitted to four venous injections. They were rendered completely refractory, and in July were sent to the slaughter-house. Further successful experiments have confirmed M. Galtier's belief that herbivorous and omnivorous animals may be rendered completely refractory to Rabies by this method of inoculation. He considers that the animals not only escape the consequence of the immediate bite, but also enjoy immunity in the future.

Correspondence.

CLEVER CRITICISM.

SIR,—The Editor of *The Journal of Comparative Pathology and Therapeutics*, in his article on "Influenza of the Horse," says:—

"If any further illustration were required of the present chaotic state of our knowledge regarding some of the most serious diseases of the horse, it would be found in the report of the Veterinary Department of the Army. By referring to this Report for 1888, it will be seen that the seven zymotic diseases of the horse recognised are—Glanders, Farcy, Horse-pox, Strangles, Influenza, Rabies, and Epizootic Fever. What the last of these diseases is must, presumably, be well known to the members of the Army Veterinary Department, for it is under these headings that the returns of sickness are made by all regimental veterinary surgeons; and yet it would be safe to say that nobody outside of the Army Veterinary Department can form any clear idea as to what disease is here referred to. Confusion is made still worse when it is observed that in this same report, under the heading of general diseases, we find ranged along with such affections as cancer, rheumatism, and melanosis, five forms of fever, viz., Simple, Traumatic, Catarrhal, Bilious,

and Anthrax. And further, among diseases of the respiratory apparatus there are classed Pneumonia and Pleuro-Pneumonia. To unravel the system of nosology here employed, or to connect it with any other, would, I think, pass the wit of man."

But the captious writer of the above paragraph does not suggest any better nosology than the one he tries to condemn; while in the same journal he omits all mention of fevers fully described in a work he has reviewed, because it was also by an army veterinary surgeon. And readers of the VETERINARY JOURNAL are already acquainted with the excellent work by Mr. Nunn, A.V.D., on the "South African Horse Sickness," a disease he has shown to be due to the growth and action of special micro-organisms. (See his reports in the VETERINARY JOURNAL, 1888-9.)

And now I may venture to explain the classification of disease adopted in the Army Veterinary Department. It is that sent in by army veterinary surgeons throughout the service. The Principal Veterinary Surgeon collects and totals them together, as he was not present to watch the cases, and therefore cannot invent names for cases he has not actually witnessed. In this the veterinary surgeon is entirely responsible; and if his nomenclature is such as calls for comment from hasty critics, the Principal Veterinary Surgeon may rightly inquire, "Whence the source of the primary weakness of nosology?" If he consults the young officers under him, and who apply for admission annually into the department, he finds that they adopt the nomenclature of their teachers.

It is clear, then, that veterinary nosology is in a very unsatisfactory state, and the source of it is not to be placed at the door of the Army Veterinary Department, but may be found a step nearer home. "Nothing worse in its way can be imagined," we are told, "than the term Epizootic Fever, and Catarrhal and Bilious Fever are but little better." Yet these are the terms which are taught in colleges to-day!

Then the writer tells us that "the nosology of human diseases, compared with veterinary systems of classification, is well-nigh *perfect*." How, then, does he account for such names as Typhus and Typhoid, Ague, Malarial Fever, Gout, and a host of similar designations which decorate the pages of modern medical literature? Or is the recent Scarlatina discussion to be regarded as a type of "perfect" medical nosology, in the language of our critic?

But not to go far, what was the nomenclature of the colleges, and the Dick Veterinary College in particular, with regard to the disease called "Roaring" in horses, until the chief of the Army Veterinary Department suggested a designation (and probably an effectual cure for the disease), which is now that of the profession?

Further on, the editor says: "Nothing but confusion can be expected to reign as long as diseases regarded as distinct are spoken of as types or forms of Influenza." And where has this critic borrowed his remark from, but from an army veterinary surgeon's article he has reviewed in the same journal? We quote the passage alluded to: "We are of opinion that a careful study of the disease called Influenza in the horse would lead to its being divided into three or more distinct affections. Further, we think that the distinctive characters of different forms of fever in the horse are such as in practice could not allow them to be confounded any longer—an opinion which all subsequent observation must tend to confirm. . . . . The practical value of studying the several varieties of Influenza, so far as they help the classification of fevers, has been to a great extent recognised, but no systematic measures have been taken to separate a long list of fevers, which are described promiscuously along with the ordinary 'Influenza.' Considering the importance of these fevers, *e.g.*, intermittent, remittent, and a

host of others, the subject is worthy, I think, of being specially investigated."

One is disposed to think, after all is considered, that the young "editor" would do better could he display a little less virulency.

In conclusion, I have no hesitation in saying that anyone with any respect for his profession would never write thus of his brother professionals.

"A DICK VETERINARY STUDENT."

FLIES AS BEARERS OF CONTAGIA.

DEAR SIR,—I am of opinion that there are many people who do not place enough importance upon the fact that *flies* are the frequent means of communicating contagious diseases from one animal to another. Take Farcy and Glanders, for instance, and note how reasonable it is to suppose that a fly or flies may alight upon a farcy ulcer or "button," and then carry the poison on to a raw sore on the body of a neighbouring animal. "SNAFFLE BRIDLE."

STRANGE NOTIONS.

SIR,—A so-called "Public Meeting" was held at St. James's Hall, London, on July 6th, "to protest against all attempts to create a panic with a view to inducing Parliament to sanction legislation enforcing the muzzling of healthy and inoffensive dogs throughout the United Kingdom, as a means of stamping out rabies."

The Bishop of Ely occupied the chair, and among the speakers there was not one qualified to speak on the subject from a professional point of view, except Professor Woodroffe Hill, F.R.C.V.S., who is reported to have said: "Pasteur is a quack, and a bigger humbug never lived. In a few years he will fall to the ground. Let him stop his experiments at his brewers' grain fermentations, and let us and our dogs alone."

He proposed "That the experience of foreign countries having demonstrated that general compulsory muzzling has not succeeded in preventing the recurrence of rabies epidemics, this meeting is of opinion that the attention of Parliament should be directed rather to the best mode of bringing home a sense of the responsibilities to owners and keepers of dogs, such, for example, as registration, than to needless and vexatious interference with healthy dogs." He was confident that rabies was a most rare disease; that it occurred spontaneously at times; and therefore muzzling was a totally unfit way to stamp it out.

It is earnestly to be hoped that, if correctly reported, the public will not accept Mr. Hill as in any way representing the veterinary profession in this matter. As for the disgraceful denunciation of Pasteur, we have reason to be sorry and ashamed that any among our number should express himself in such a manner, and bring upon us the ridicule of scientific and intelligent men. Airing such strange and erroneous notions as the above, not only damages the person who holds them, but casts a shade over the profession.

F.R.C.V.S.

July 10th.

PROTECTIVE INOCULATION.

DEAR SIR,—Many of us, methinks, have gone "inoculation crazy." It seems that men and the lower animals will soon be vaccinated or inoculated with the bacteria of all contagious diseases under the sun, Syphilis included. Healthy and vigorous children may soon be converted into cesspools of diseases.

Sir James Paget's words are worth calling to mind: "The progress of the vaccine or variolus infection of the blood shows us that a *permanent morbid condition* of that fluid is established by the action of these specific poisons on it; and although this condition may, so far at least as it protects the individual from any further attack of the same disease, be regarded as exercising a beneficial influence upon the economy, yet it is not the less to be looked upon *as a morbid state.*

"In forming an estimate of the persistent changes produced in the blood by this and similar infectious diseases, we must not lose sight of the influence *which the tissues themselves altered by the inoculation*, exercise upon the blood; they will necessarily react upon it, so as to assist materially in preserving a permanent morbid (though beneficial) condition."—*Lectures on Inflammation*, 1863.

A brother of mine many years ago was vaccinated from a diseased child, and the result was that he was very unwell, and his submaxillary glands were, and have been ever since, enlarged and much affected. Hereditary Syphilis may be latent in a child for months, and even years, and, notwithstanding, may infect other children if their vaccine is taken from it.

Herbert Spencer, speaking of the deplorable and increasing ill-health of the rising generation, thus expresses himself: "We are not certain that the propagation of subdued forms of constitutional disease, through the agency of vaccination, is not a part cause. Sundry facts in pathology suggest the inference that when the system of a vaccinated child is excreting the vaccine virus by means of pustules it will tend also to excrete, through such pustules, other morbific matters, especially if these morbific matters are of a kind ordinarily got rid of by the skin, as are some of the worst of them. Hence it is very possible—probable even—that a child with a constitutional taint too slight to show itself in visible disease may through the medium of vitiated vaccine lymph taken from it convey a like constitutional taint to other children, and these to others."

Then as to M. Pasteur's inoculation for Hydrophobia, it seems to me that *it induces no disease, general or local.* Is it not a fact that the Prussian Government prevented the further inoculation of sheep with Anthrax virus?—I am yours faithfully,

"NATURE."

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from F. Duck, A.V.D., Woolwich; "F.R.C.V.S.;" "Snaffle Bridle;" J. A. Nunn, A.V.D., Barrackpore, India; J. J. Meredith, A.V.D., Dhow, India; "A Dick Veterinary Student;" W. Awde, Stockton-on-Tees; R. W. B.; A. W. Hill, London; "Nature;' S. Villar, Harrow.

BOOKS AND PAMPHLETS: *G. and A. Gresswell*, The Diseases and Disorders of the Ox; *E. Dele*, Expertise Obligatoire des Viandes; Annual Report of the Agricultural Department; Bulletin des Séances de la Société Nationale d'Agriculture de France; *M. Reuter*, Die Staupe der Hunde; *N. Thionot*, Précis de Microbie Medicale et Vétérinaire.

JOURNALS, ETC.: *Annales de Méd. Vétérinaire; Der Thierarzt; Recueil de Méd. Vétérinaire; Wochenschrift für Thierheilkunde und Viehzucht; Revue Vétérinaire; Der Hufschmied; American Live Stock Journal; Lancet; American Veterinary Review; British Medical Journal; L'Echo Vétérinaire; Archiv fur Wissenschaftliche und Praktische Thierheilkunde; Deutsche Zeitschrift für Thiermedicin und Vergleichende Pathologie; Edinburgh Medical Journal; Live Stock Journal; Mark Lane Express; Repertorium der Thierheilkunde; Journal de Méd. Vétérinaire.*

NEWSPAPERS: *Spalding Free Press; Queenslander; New York Herald; South-Eastern Counties Gazette; Scotsman.*

THE VETERINARY JOURNAL

AND

Annals of Comparative Pathology.

SEPTEMBER, 1889.

REPORT ON A FATAL DISEASE AMONG GOATS IN THE DISTRICT OF KHANDEISH.

BY JOHN HENRY STEEL, PRINCIPAL, BOMBAY VETERINARY COLLEGE.

In a letter dated 7th May, 1889, Mr. P. R. Metha reported fatality among goats of the Government flock on the Bhadgaon Farm, which he considered to be due to Pneumonia, and which he stated to be very common in the neighbourhood of Bhadgaon. Treatment seemed to have no effect. The Government flock of about 45 she-goats, 3 he-goats, and 6 kids was purchased for 112·12 rupees, in the months of February and March, at markets in different parts of Khandeish. It is supposed that the disease was brought by some of the animals then purchased. On each of the following days a she-goat died, 17th, 23rd, and 30th of April, and 7th and 8th of May. These animals had been subjected to treatment, consisting of administration of ammonia and ether internally, and application of stimulants to the chest externally. Finding this treatment ineffectual, Mr. Metha very judiciously decided to sell the animals to the butcher directly they were noticed to be affected. Thus from the 8th to the 18th of May nine animals were disposed of in this way at an average price of a little over two rupees. Of these one was a he-goat, and it was specially noted that no kids were affected. Two births in the flock and the above-mentioned 14 fatalities reduced the strength to 32 she-goats, 2 he-goats, and 8 kids on 18th May. Enquiries showed that casualties among sheep stock on the farm since 1882 have been in the proportion of 30 per cent. to the strength, according to

the following table extracted from the annual reports of the farm :—

Kind of Sheep.	Strength.						Losses.						Remarks.
	1882	1883	1884	1885	1886	1887	1882	1883	1884	1885	1886	1887	
Dumba ewes..			9	3	3	3			6*	...	...	...	*In lambing.
Country ewes			35	31	49	41			2	4	10	12	
,, yearlings			...	...	?	...			...	...	16	...	
Cross ewes ...			26	70	88	90			...	7	4	16	
,, rams & wethers			33	24	22	23			4	6	6	18	
,, yearlings			27	24	28	50			...	...	9	22	
,, lambs ...			60	6	21	8			8?	19	19	2	
Goats			13	10	17	22			2	...	2	6	
Total	85	181	203	168	230	237	38	93	22	36	57	76	
Average ...	184						53·67						
Percentage	...						29·1						

The losses thus specified are under all headings, but it seems probable that the disease under consideration contributed to the list in no slight degree. The shepherd in charge of the goat flock knew the disease well, although he failed to recognise the cases at very early stages. The mutton butchers of Bhadgaon were quite familiar with the characteristic *post-mortem* lesions, and it was ascertained on enquiry that the disease, which is known distinctively as "rog" (namely, *the* disease), causes considerable ravages among the sheep and goat flocks of the Dongras, who traverse the district with sometimes as many as several thousand sheep, forming flocks which are hired by agriculturalists for manuring their grounds. It is said that four or five thousand sheep and goats belonging to one owner have in one season been carried off by the disease, and that in this way several wealthy men have been ruined. Thus it is evident that disease among goats is prevalent and wide-spread, and requires serious consideration, as being a source of such loss to the community. It is supposed that calves sometimes suffer from it, but the evidence as to correctness of this view is very imperfect. I did not see any cases among sheep, but there seems ample evidence that it affects them as well as goats. It occurs in adult animals of both sexes, and appears to be quite independent of season, the general view being that it depends upon contagion only. That the disease is Pleuro-pneumonia is sufficiently evident from *post-mortem* examination, and that it is specific is evident from one side of the chest only

being affected, from the disordered condition of the blood, and from the *post-mortem* lesions in general. Whether it is the same disease as specific Pleuro-pneumonia of cattle, or whether it is merely a close ally of that disorder, remains to be seen. I think the latter view more probably correct, as we have no evidence of adult cattle on the farm taking the disease, which would be the case probably were it communicable to them. The symptoms and *post-mortem* appearances are very similar to those of "Pleuro" in cattle. They can best be illustrated by the following cases, which especially received attention from me:—

Case 1.—Supposed to have recovered from attack, but still kept apart from the flock. Temperature 103·1° in the evening; coughed freely when handled, and had a slight discharge from the nose.

Case 2.—A she-goat supposed to have recovered from an attack, and which had been grazing with the rest, was observed to have a difficulty in keeping up; suffered from paroxysmal cough, had discharge from nostrils, and was extremely emaciated, although the coat looked glossy, and the eyes bright and glistening. The mouth was pale; pulse 80; evening temperature 104·2°; morning temperature, 103·8; conjunctiva somewhat bronze-coloured; anus dry and hot. Two kids were running with this patient, and they looked well, but they must have got their sustenance from elsewhere. The lung-sounds were lost on the right side, and pressure on the intercostal spaces seemed to pain the animal. It is evident that the recovery in this case was simply an improvement in the appearance of the animal, when the attack, after being acute, commenced to assume the sub-acute form. She was slaughtered for *post-mortem* examination, and the carcase sold for 1·8 rupees. Autopsy immediately after death showed abdominal organs healthy, with the exception of the spleen, which weighed 6½ ozs., and was rather firm in consistency. The liver was somewhat pale, and weighed 1 lb. 7 ozs. The disease was confined almost entirely to the right side of the chest, the pleural cavity of that side being obliterated by adhesion, except at the extreme infero-posterior part, where was accumulated an amount of clear serous fluid, which distended the remainder of the cavity, and coagulated like size into a greenish opalescent mass after removal from the body. The endocardium of the left side was congested; the left lung healthy. The right lung was consolidated, except at the extreme anterior part, of a greenish metallic colour on the surface, quite useless for all practical purposes, exhibiting from before backwards the following characteristic appearances:—

(*a*) Congestion.

(*b*) Thickening of the pleura and of the parenchyma, also nodules, probably due to accumulation of pus in the air-cells.

(*c*) This condition exaggerated.

(*d*) Grey hepatisation, or nodules in a state of suppuration.

(*e*) Parenchyma undergoing cartilage-like thickening, encroaching on the hepatised portion, until

(*f*) The whole tissue becomes a cartilage-like mass. This lung weighed 28 oz., whereas the left weighed only 6 oz. The total weight of the carcase was 38 lbs.

This case seems to have illustrated well the disorder in its sub-acute or advanced stages.

Case 3 was brought in from the neighbouring village of Vadji. The temperature was found to be 103·4°.

Cases 4 and 5 returned to the flock as recovered some days before; each gave a temperature reading of 103° (normal).

Case 6 was first noticed as sick on the morning after my arrival. It was suffering from acute fever, and gave a temperature reading of 106·2°. There was cough, slight nasal discharge, pale mouth, pink or bronzed conjunctiva, dry nose and anus, bright eyes, glossy coat, modified lung sounds, and quick pulse and breathing were present in this as in other cases. The animal was forthwith slaughtered, and autopsy showed the carcase in excellent condition, weighing 56 lbs. when dressed, and sold for 3 rupees; spleen 8 oz. in weight, and slightly nodular. The liver was congested somewhat, weighed 2 lbs. 4 oz., and showed small local patches of hepatitis. The right lung weighed 9 oz.; the left in this case was the seat of disease, and weighed 19 oz. The blood was normal. There was no fluid in the chest, but slight local Pleuritis, also a little sub-endocardial extravasation; the trachea was markedly congested, and the bronchi also, their passages being filled with froth and phlegm. The left lung was consolidated, especially in its posterior division, its surface being of a greenish colour, and presenting a number of blood-spots, varying in size and tint. This case well illustrates the disease in its acute phase. Microscopic examination of the blood with 1-5 in. power led to no detection of organisms in that fluid.

Evidently the disorder is a specific Pleuro-pneumonia, but such a disease is unknown in Europe, except that M. Duquesnoy, in the Lyons *Journal de Zootechnie*, has quite recently described a contagious Pleuro-pneumonia in goats, in which he found on *post-mortem* examination both lungs hepatised with adhesions, and effusion into the right pleural sac, also the lung-sections marbled, and of various colours; the pericardium congested, and the cardiac serosa ecchymosed. The symptoms showed by the affected animals were frequent and deep cough; abundant and gummy nasal discharge; lactation, rumination, and feeding suppressed; respiration difficult and painful; skin dry and warm; eyes sunken

and watery; conjunctivæ injected; mouth warm and congested; breath offensive; pulse 120; temperature 103°; diarrhœa, with fœtid and greenish evacuations; a dull sound on percussion, and pain on pressure of the chest; emaciation. The period of incubation was estimated at four days.

This outbreak seems to have rather closely resembled that in Khandeish, but differs from it in some respects, notably in the presence of diarrhœa, and in both lungs being affected. This does not prevent it being the same disease, however, because geographical conditions materially alter manifestations of a disorder.

In the VETERINARY JOURNAL, No. 13, 1881, p. 171, is a report on Contagious Pleuro-pneumonia in Angora goats at South Africa, by Mr. Duncan Hutcheon, veterinary surgeon for Cape Colony. This disease was indicated by cough, a tendency to lie down, to lag behind the rest of the flock, the animal being off feed only in the advanced stages, and giving a peculiar grunt between each mouthful of food. In severe cases there was a grunt at each expiration, and the animal lay down with one fore-leg stretched out, the tongue protruded, mouth open, and a flow of frothy saliva from it, a distressing bleat, and temperature 105° to 107°. Autopsy showed small, pea-shaped, light yellow nodules, with a port-wine coloured ring around each, one-third to one-eighth inch in diameter, sometimes in one lung only, and diffused irregularly throughout the lung substance, especially predominating in the posterior part. As these enlarged and coalesced they rendered the lung solid. The Pleura-pulmonalis was at first affected only over the nodules, later the whole became blue and thickened; little fluid was found in the pleural cavity, but much in the pericardium. The endocardium was petechiated, and the lungs were sometimes adherent; the serous fluid coagulated firmly on standing. It was found that when the pleura was most affected the disease proved most fatal; also that the weather influenced its progress and fatality. About one-third of the affected recovered, but how long a time should be allowed before recovered animals might safely mix with the unaffected was not ascertained. The disease was distinctly contagious, the period of incubation being put at ten days, although eight days after mixing with the sick, six goats became dull and feverish. No lesions were detectable, *post-mortem*, until the tenth day. Neither sheep nor cattle could be made to take the disease, although this point as regards sheep seems not to have been conclusively settled. Native goats took the disease from the imported Angoras. Drenching with lung-tissue, pleural fluid, and water, mixed and strained, did not cure or prevent the disease; inoculation was equally ineffectual. The

flesh when eaten did not cause any disease of man or other animals.

Treatment.—Curative measures proved ineffectual, although quiet, laxatives, and diuretics were supposed to hasten natural recovery. Isolation and disinfection or prompt destruction of the sick cut short the outbreaks.

The disease thus described by Mr. Hutcheon closely resembled that studied in Khandeish, but presents a few interesting and suggestive points of difference; these possibly are the outcome of difference in geographical range.

In Morocco a virulent Lung Disease of goats prevails, and is termed "Bayoor;" it does not attack sheep. Prophylaxis is said to be effected by placing a piece of diseased lung in a slit made in the ear of an unaffected goat, and subsequent slight cautery (VETERINARY JOURNAL, Sept., 1887).

Finally, we must consider a few practical points with regard to this disease:—

1. How may it be most simply and practically diagnosed in the earliest stage? Elevation of the internal temperature (as detectable by the thermometer) is apparently absolutely the earliest symptom; but for practical purposes it is sufficient if the shepherd be given orders to at once isolate and report any animal which coughs, discharges from the nose, has discoloured eye-membranes, seems unable to keep up with the rest of the flock, or goes off its feed.

2. What is the best treatment practicable at the Bhadgaon Farm? (*a*) Close supervision, with a view to early detection of case; (*b*) prompt isolation of sick and suspects; (*c*) segregation for at least fourteen days of all freshly-purchased animals; (*d*) thorough disinfection of any sheds occupied by the herd, or penning them at nights in the open with frequent change of site of the pen; (*e*) continuation of the system of prompt slaughter and sale of animals directly they are found to be diseased.

Great care should be taken with a view to isolation, for at least two months, of those goats which have apparently recovered. A most interesting and valuable series of experiments might be made with a view to prophylactic inoculation. Mr. Methan's veterinary experience and studies at Cirencester render him fully competent to conduct such experiments, if he has time available, and I shall be most happy, in that event, to explain to him what experiments should be made, and the precautions necessary in carrying them out, in order to procure sound results.

I consider that the prevalence of this disease is not a sufficient cause for cessation of the most interesting experiments on goat-rearing which are being made at Bhadgaon Farm, for I think that

rigid enforcement of repressive measures, especially with a view to prevention of reintroduction from without by fresh purchases, will suffice to keep the disease well under control. Also, fortunately, the people in Khandeish constantly eat goat mutton, and prefer it to that of sheep, which they consider not strong enough. Consequently there is a ready sale for carcases, and, as we have seen, these are in good order, and bring full price if the goat be destroyed in the earliest stage of attack; while such evidence as is to hand tends to the view that no ill-consequences to mankind are likely to result from ingestion of the flesh of animals suffering from this disorder.

A MOLE IN THE MARE.

BY J. BRETT, M.R.C.V.S., MANSFIELD WOODHOUSE, NOTTS.

As anidian monsters are so seldom met with in the mare, the following facts may interest veterinary readers :—

The animal, a shire cart-mare, had run within a month or six weeks of her full time, the gestation up to that period appearing normal, when she was noticed to show symptoms of uneasiness, as though parturition was about to take place. These continued for several days, and were succeeded by violent expulsive throes. After many efforts, a hollow bony body, about the size of the adult human skull (which it very much resembled) was voided. Considerable hæmorrhage followed, laceration of the passage, and retention of portions of membrane retarded recovery.

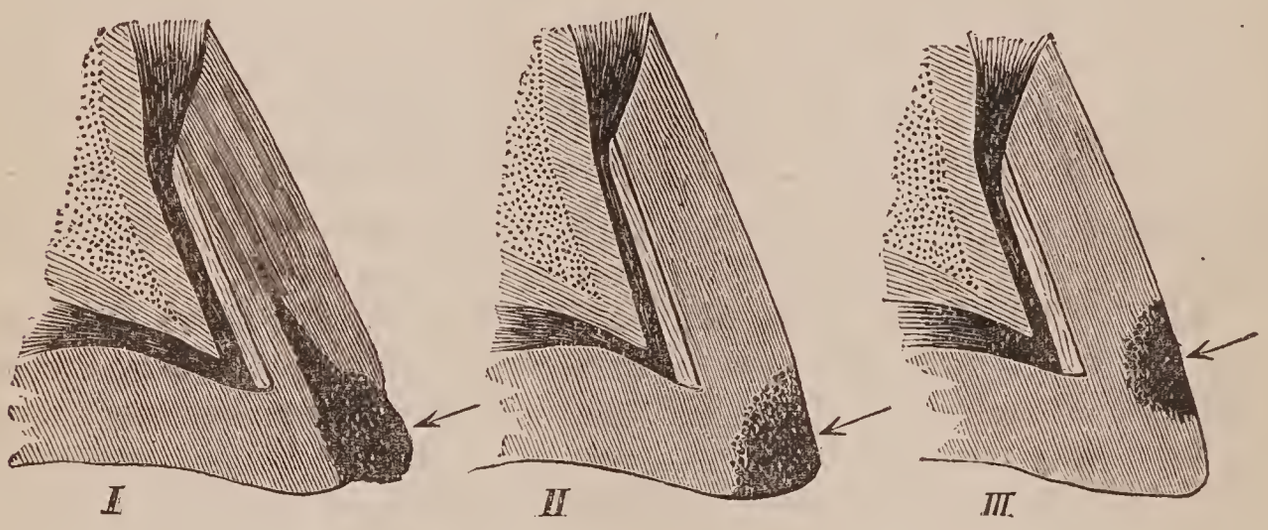
The "abnormality," the shape of which is described above, was full of clotted blood, and covered by a thin membrane, several inches of the umbilical cord remaining attached about the position of the occipital crest; depressions resembling the orbits and mouth occurred on the opposite side. I had some difficulty in convincing the owner of the mare that his suspicions, which it is needless to mention, were groundless.

EXTERNAL SEEDY TOE.

BY J. A. NUNN, F.R.C.V.S., F.R.G.S., ARMY VETERINARY DEPARTMENT, BARRACKPORE, INDIA.

THIS condition of the foot of the horse to which I have applied the above designation, for want of a better, appears to have escaped general notice, but as far as my experience goes it is not by any means rare, at all events in this country. As far as I have been able to determine, there appear to be three varieties. In the first the disease commences in the ordinary internal manner,

progressing upwards between the two tables of horn, and at the same time outwards; but the morbid process is faster between the horny tables than outside; in other words, the height to which the disease extends is greater internally than externally, as is shown in the diagram of a section of the foot No. 1. The second variety commences outside the horn, at the plantar surface of the toe, and extends upwards and inwards, as is shown in the diagram No. 2; and the third appears anywhere between the coronet and the ground, gradually extending into the substance of the horn layers, as in No. 3. In the latter case the progress appears to



be faster in a downward than an upper direction, but I am inclined to think this is more apparent than real, as the rate of growth of the horn downwards would detract from the progress of the disease upwards, although it spreads over the horn at the same rate. That it has not attracted much attention is, I take it, from the fact that it is noticed from its very commencement, whereas internal seedy toe is not; but amongst animals not well cared for this condition of the foot has come under my notice.

P.S.—The drawings are only ideal diagrams, not sketches from nature.

ANEURISM OF THE AORTA.*

Etiology.—The causes of enlargement of the aorta are mostly due to displacements of this vessel caused by chronic endarteritis and mesarteritis, accompanied by fatty and calcareous degeneration. Aneurism of this vessel may be also produced by the presence of the strongylus armatus, or by that of the spiroptera sanguinolenta. It may be also traumatic, or due to muscular strains, or a kick, or a fall, etc.; it often also appears from a peculiar diathesis

*Translated by R. W. B.

(Raymond, *Recueil de Méd. Vétérinaire*, 1867). We have recorded one case where rupture in aneurism of the aorta was traceably excited through fright in a young remount (R. W. B.).

Pathological Anatomy.—Aneurism of the aorta appears either dilated in the form of a sack, or stretched, or like a hollow cylinder, which is often in contact with the neighbouring organs, such as the liver, intestines, etc. The size of the aneurism may exceed that of a man's head. Schütt observed a case of aneurism where this vessel was so extensively enlarged that it touched the stomach, as well as the small and large intestines. This aneurism may be either in the abdominal portion, the thoracic portion, or at the very origin of the aorta (*Oesterr. Vierteljahresschrift*, 1882, p. 42). Lustig found a very extensive aneurism in a horse, which originated about 6 cm. from the origin of the abdominal aorta, and reached up to the renal artery (*Deutsche Zeitschrift f. Thiermed. u. vergl. Pathologie*, 1876, p. 383; 1878, p. 17). Owing to the formation of the aneurism, the walls of the vessel become atheromatous and undergo fatty degeneration, some portions being calcareous in patches. The structure of the sac is fibrous, and frequently of an exfoliating and crumbling character. Röll has tried cupping and firing in the treatment of these cases with, he thinks, some benefit (*Lehrbuch der Pathologie u. Therapie*, 1885). Owing to the enlargement of the aorta to such an extent as to press on the lungs, stomach, intestines, liver, kidneys, and other organs, it affects these several organs in various ways, and may even burst, discharging its contents into the thorax and abdomen, several instances of which have been mentioned by Labat and Cadeac (*Revue Vétérinaire*, 1884, p. 105) and Vogel (*Repertorium der Thierheilkunde*, 1863, p. 116).

Symptoms.—In most cases aneurism of the aorta is not even suspected, but suddenly, owing to rupture, the animal dies from hæmorrhage. It has been most frequently mistaken for colic in practice. Death from internal hæmorrhage is preceded by acute convulsions. Collapse most frequently results, and the horse drops suddenly to the ground and expires almost immediately. Lustig describes the symptoms thus: The horse struggles violently, then shakes the hinder parts of the body, and all of a sudden falls to the ground, and suffers from extreme dyspnœa and epileptiform convulsions, the head being bent towards the back and the legs stretched out. It is hardly possible to devise any plans of treatment, since the animals generally collapse all of a sudden, without showing any previous symptoms. In aggravated cases there will be present symptoms diagnostic of circulatory derangement, and special symptoms when the aneurism presses upon particular parts and organs.

Treatment.—Injections of ergotine and sugar of lead have been practised, and also galvano-cautery.—*Lerhbuch der Specillen Pathologie und Therapie der Hausthiere,* by Friedberger *u.* Fröhner, Bd. i., 1886.

REPORT ON AN OUTBREAK OF "ANTHRAX" AT MHOW, CENTRAL INDIA, AMONG THE HORSES OF THE CARABINEERS.

BY J. A. MEREDITH, A.V.D., MHOW, CENTRAL INDIA.

(*Continued from page* 81.)

Preparation of food.—After my taking over veterinary charge of the regiment, I consulted the officer commanding the regiment with a view of improving the condition of the horses, and he most readily fell in with my views. The horses had previously been fed upon gram entirely uncrushed, but soaked for a few hours before feeding. This was altered, and the officer commanding bought a gram-grinding machine for each troop, so we had the grain well crushed, in fact much better than it possibly could be done by the ordinary hand-stones. Thus crushed, it was given mixed with one pound of bran *unsoaked* and only previously damped to prevent the bran flying about. Dry grass or hay and the green grass or hariala was given in the usual manner.

Water supply.—The water supply of Mhow is all obtained at present from wells which are distributed all over the station. On the whole, the water-supply is deficient in quantity but fair in quality. When the Government Analyser examined the wells in 1878, some were declared worse than others, but in none was any trace of sewage discovered. A water scheme was brought forward in 1875 to construct a tank among the hills about four miles away, and to bring the water in covered pipes into the station. Some years the heavy battery has been obliged to go out into camp in the hot weather on account of the scarcity of water; but this will now be avoided, as the proposed water scheme is almost complete, and is now supplied to the horse artillery lines and other places in the station. The wells used for the supply of water to the European cavalry lines contain a sufficient, though not an unfailing, supply. The water appears to be good, and I enclose an analysis of each. One-half the regiment was watered at well No. 7, and the other half at well No. 9. F Troop watering at well No. 7, together with E, G, K Troops; whilst B Troop watered at well No. 9, with A, C, and D Troops. Reasoning from this fact I cannot attribute the cause of the outbreak to this source or any contamination in the water-supply.

Lime recommendation.—Lime had been recommended for use in the stables previous to the outbreak, but it was not sanctioned on account of additional expense.

Amount of work horses have been performing of late.—The amount of work the horses have been performing of late has been quite up to the average, including the usual squadron trainings and other hot season exercises; but taking them generally, a vast improvement was to be observed since the camp of exercise at Rupaheli, during which the horses must have lost condition; none of the horses were in any way gross.

History of present outbreak.—The present outbreak made its appearance on August 16th, about 7 a.m., and came under my notice in this manner:—About 7.30 a.m., on the 16th August, I was attending to a sick bullock belonging to the 4-1st (Heavy), Welsh Division, Royal Artillery, when a note arrived from the Farrier Quartermaster-Sergeant, the Carabineers, stating that nine horses of B Troop were admitted into hospital suffering from Fever. I at once proceeded to the chief station veterinary hospital, and upon arrival found the above-mentioned cases and a few others reported sick waiting outside for examination. I examined the admitted horses, and found, as will be seen from reference to each individual case, that they all presented a feverish appearance, one horse especially, whose temperature was over 107°F.; the others varied between this and 103°F. I endeavoured to make as many enquiries as time, etc., would permit, and at first I thought it might be ordinary fever, seeing they were *all grey* horses, and knowing well that the syces will wash (although strictly forbidden to do so) animals of this colour, as it saves a certain amount of labour; but my idea was soon dispersed, as the troop sergeant-major informed me that none of the horses had been washed that day or the previous one. During the time I was making a minute examination of the horses, one suddenly became worse, perspiration flowing down his legs, and his breathing being very distressed. I administered some medicine to all admitted, but before the day was out I had lost two of the best horses within 15 minutes of each other, and two more later on in the evening. Upon *post-mortem* examination of the first two, Anthrax Fever was observed to be the cause of death. My opinion previous to this was to the effect that Anthrax was the cause of this sudden epidemic, but careful not to make an error, I determined to rely upon *post-mortem* examination.

I immediately reported the outbreak to the adjutant, who, in due course, reported the outbreak to the General officer commanding. I also reported the outbreak by wire to the Inspecting Veterinary

Surgeon, Bombay. On the night of the 16th instant I had established my field hospital upon the left hand side of the race-course, that is looking from the lines and veterinary hospital, and about half-mile from the latter place.

Previous to this I made a thorough examination of the remaining horses in B Troop, carefully putting aside any suspicious case and admitting it into the Anthrax Hospital, but some distance away from the horses with pronounced symptoms. The remaining horses were placed on the left of the new hospital with the suspected cases further down the line on the right, whilst the acute cases occupied the extreme right. Care was taken that the wind was always blowing from the direction of the healthy subjects, and fortunately it did not vary more than a few points at any time. So no inconvenience was caused by the wind turning.

I attach clinical observations of the whole of B and F Troops taken from the date of the outbreak until a day when I considered it unnecessary to take further observations; from this will be seen the general increased temperatures of all the horses.

The disease continued with remarkable rapidity, so much so that all the veterinary establishment was more than fully occupied day and night.

Number of cases admitted.. — Upon Thursday, August 16th, nineteen cases were admitted into the field hospital. The following were their respective numbers:—B Troop, 22, 29, 11, 59, 33, 5, 16, 49, 21, 25, 4, 23, 14, 63, 41, 1, 2, 65, and 6; of this number the following died, as will be seen from the record of treatment:—B, 63, 1, 59, and 22. On the following day, the 17th August, Troop Horses B 12, 17, and F 12 were admitted with Anthrax. Upon the latter horse presenting symptoms of Anthrax, I immediately suggested to the officer commanding that F Troop should also be removed to the field hospital; this being sanctioned, I arranged it on the right of the sick horses that were in the veterinary hospital at the time of admission of the Anthrax cases.

I have endeavoured to explain the positions of each more fully on a map, upon which I have marked the various divisions of horses, which were as follows:—B Troop not admitted cases on the left; next to these, with a distance of 400 yards apart, came the less pronounced cases, whilst the more serious cases were picketed between the latter horses and the fire (temporary cinerator). The last-mentioned were removed nearer still to the fire in the event of their cases becoming hopeless. After this I had arranged the real sick horses with the less severe cases on their right, both being well away from the Anthrax cases,

and the extreme right was brought up by F Troop; the whole line extended over a mile, and a half-mile broad.

On the 17th August two more cases proved fatal, horses B 29 and 21. On the 18th instant the following horses were admitted:—B 18 and F 32; and the following horses died upon this day:—B 11 and 33. August 19th, only B 61 and F 14 were admitted, but B 23 and F 14, 41, and 65 died during the night or early morning of the 19th. Some of these cases would undoubtedly have recovered had we not been so terribly unfortunate as to encounter a 48 hours' continuous rainfall, during which the hospital became a mud pond, and the horses were standing over their fetlocks in mud, the blankets were saturated with the rain, and we were quite unable to keep them dry; this, coupled with the inability to keep the horses in their standings from the head and heel pegs continually flying as the horse made any slight movement; this was, of course, most noticeable in the restive cases. These were unfortunately not all the difficulties we had to contend with; for, do what you would, the syces could not be induced to perform their duties well, being more or less cold and miserable with the rain; in fact, they looked as pitiful almost as the horses. This rainfall, although not a heavy one, but continuous, played a most prominent part in so many cases proving fatal during this period.

On the 20th August, B 5, 16, 12, and 14 and F 32 died in the hospital. On the afternoon of this day the Inspecting Veterinary Surgeon, Bombay, arrived in Mhow on duty, and remained until the 25th instant, during which time the following horses died:—August 22nd, B 2 and F 14. Assisted by me, the Inspecting Veterinary Surgeon, Bombay, made a *post-mortem* examination on both of these horses, in which remarkable appearances presented themselves, and I enclose a very rough sketch of each. Upon the 26th instant, the day after the departure of the Inspecting Veterinary Surgeon, Bombay, Troop Horse B 56 was admitted with acute symptoms of Anthrax; the record and treatment of same is herewith sent, and I shall have occasion to refer more in detail to each case as I take them individually. Troop Horse F 30 was admitted on the 29th, and died upon the 30th instant. I shall have occasion to enter fully into this case, as upon it lies the basis of my report and opinion of the outbreak; so I have thought fit to arrange it in my column of remarks. The following is a short record of each case as admitted into hospital, with as full a description of each as time would permit me to note. I regret that, in consequence of my attention being required all day attending to the very sick patients, I was unable to do full justice and gather as many minute symptoms of each case as were presented.

I take the following cases from the Record of Treatment Book, as they were entered during the height of the outbreak.

Case I.

Subject.—Persian entire, grey, aged seven years. Case 539, B 22, 16th August, 1888—Anthrax. Admitted at 7.30 a.m., temperature 107, pulse 44, respiration 26, mucous membranes yellowish red in colour, exhibits pains of a colic nature, moving head and neck up and down, stamping both fore and hind feet as if trying to kick his abdomen; nostrils dilated; lower lip pendulous; eyes staring and glassy, and in appearance looked swollen. In an hour's time the patient became much worse; perspiration flowed down his legs, blowing hard, pulse weaker and more frequent. Upon admission I administered aperient pill, Aloes Barb. 5 drs., Pulv. Zinzib. 1 dr., and followed by repeated doses of stimulants and Acid Carbolic; but the patient gradually became worse and more restive, hanging his head and resting it upon the loose box walls. Spasms of the head and neck of a tetanic nature followed. He fell suddenly, and after great struggling died about 5.30 p.m. Discharged died.

Post-mortem.—Exterior appearances.—No swelling or tumours visible externally, slight crepitation of the skin. Upon opening the abdominal cavity it contained a small quantity of foul-smelling gas and a great quantity of sero-hæmorrhagic fluid, in which was floating about a number of filaria papillosa (male easily distinguishable by his spiral tail), some on the posterior surface of the liver, also on the borders of the intestines connected with the mesentery. Deep ecchymoses of the visceral and parietal peritoneum. All the glands of the mesentery were infiltrated and enlarged with characteristic exudate; the vessels of the mesentery were most prominent and of a dark colour, showing great extravasation. The large vessels contained blood of a tarry-looking color indisposed to coagulate. *Heart* soft, marked with bluish spots, pericardium showed ecchymoses, pericardial fluid extensive and yellow in colour. *Liver* increased in size, friable, and, upon incision, blood of a tarry colour freely escaped. *Lungs*, great serosity in the chest cavity, pleuræ covered with dark spots. *Spleen* of a characteristic pale blue colour, nodulated, enlarged, and with distended capsule. *Urinary organs*, right kidney enlarged, great serosity round the pelvis of each. No indications were observed in the retropharyngeal or laryngeal regions, it being a case of Intestinal Anthrax. Microscopic examination of the blood after death proved it to be a case of Anthrax.

Case II.

Subject.—A grey Persian entire, aged seven years. Case 540, B 29, 16th August, 1888—Anthrax. Admitted about 8 a.m. This animal presented similar symptoms to the one just recorded. Pulse 56, respiration 18, temperature 106·3, but pulse quite of a different nature, being full and strong; moving lips and head; drooping ears; extremities cold; appetite slight; breathing shallow and quick; the beats of the heart were most distinct. Gave aperient pill, Aloes Barb. 5 drs., Pulv. Zinzib. 1 dr., followed by two hourly doses of Acid Carbol. 7.30 p.m.—No improvement, patient much the same, temperature 106·2, eating little food. 17th August, 1888, 6 a.m.—Pulse 48, temperature 104. No improvement, grunting and showing pain, moving head and neck up and down, and hanging on the head rope. 12 a.m.—No improvement, Acid Carb. given every three hours. 3 p.m.—Much worse, cannot recover. 4.45 p.m.—Discharged died.

Post-mortem. — Extensive extravasation of blood in the subcutaneous connective tissue, tumefaction of the mesenteric glands, congestion of the lungs and brain. Rigor mortis slight, escape of bloody fluid from all the natural openings, the rectum of a deep red colour and everted. On opening the abdomen it was filled with the characteristic exudate of a dark yellow colour; the intestines were generally red coloured and infiltrated with blood. The *spleen* little above its normal size, but of a livid hue, and slight nodulation was observed on its surface. The blood upon examination revealed the presence of the Bacillus Anthracis.

Case III.

Subject.– Grey Persian entire, aged eight years. B 11, 16th August, 1888—Anthrax. This horse was admitted at 10 a.m. Pulse 57, temperature 107.1, blowing hard, uneasy, and exhibited a haggard expression; drooping ears; glassy eye; mucous membranes injected and of a yellowish tinge; lower lip hanging, stamping of the feet, general drowsiness and prostration, and appears to be suffering from colic. No external swellings were to be observed. Gave aperient pill, Aloes Barb. 5 drs., Pulv. Zinzib. 1 dr. 10.30 p.m. —Patient no better, gave Sodæ Bicarb. ½oz. in a ball, eating a little during the day. 17th August, 1888, 6 a.m.—Much the same, but showing more pain, keeps lying down and getting up. Gave Acid Carb. 1 dr., together with a stimulant. 6.30 p.m.—Pulse 40, temperature 104; no improvement. Has been raining all day. 18th August, 1888.—Horse much worse; still raining; blankets wet

and cannot dry them, ground fetlock deep in mud. 12 a.m.—Continues to get worse, cannot recover; bowels have not responded to aperient. Patient died at 2.10 p.m. Discharged died.

Post-mortem examination revealed the following:—On opening the abdominal cavity a great quantity of sero-hæmorrhagic fluid was present, the glands of the mesentery were enlarged and infiltrated, and dark coloured markings were observed all over the peritoneum, deep infiltration of the large and small intestines, more so at the point of attachment to the stomach; in the sub-lumbar region tumours of various dimensions were visible, containing a serosity of a yellow colour; the mass of fatty tissue situated around the kidneys was also infiltrated. *Spleen* was the seat of characteristic and most apparent lesions, being greatly increased in size, and weighed 12¼lbs., very much thickened and elongated, of a livid blue colour, with capsule distended and rupture of the same, allowing the thick coloured blood to exude freely. Microscopic examination revealed the presence of the Bacillus Anthracis.

Case IV.

Subject.—A grey Persian gelding, aged seven years. Case 542, B 59, 16th August, 1888—Anthrax. Admitted at 8 a.m. Similar symptoms to the other cases; runs back in the corner of the box; colic pains; general drowsiness, mucous membrane injected; pulse 52, respiration 42, temperature 102·3. Gave Mag. Sulph. 8oz., Spt. Æther Nit. 1oz. 12 a.m.—No better; gave Acid Carb. 1dr. in water. 7.30 p.m.—Patient has gradually become worse, and died after great struggling. Discharged died.

Post-mortem.—Intestinal form.—Abdominal cavity containing a great quantity of dark yellow exudate, the peritoneum and mesenteries covered with ecchymosed spots, the large veins of the intestines were of a bluish appearance, and tumours were present in the sub-lumbar region. Liver enlarged and contained a quantity of tarry-looking fluid, which freely escaped upon making an incision, very friable and easily broken down. The yellow-stained extravasations were observed throughout the body. The pericardium was covered with ecchymosed spots, and the pericardial fluid was extensive; the large vessels of the heart were filled with tarry-looking blood, and the muscular tissue of the heart was covered with dark coloured markings, the base being studded with yellow spots; the chest contained an amount of serosity, and the lungs presented a congested appearance; the kidneys were increased in size and friable, no manifestations were observed externally, and the pharyngeal region was free from infiltrations.

The intestinal lesions were conspicuous in this case. Microscopic examination showed the presence of the Bacillus Anthracis.

Case V.

Subject.—A grey entire Persian, aged eight years. Case 543, B 33, 16th August, 1888—Anthrax. Admitted at 10 a.m. Pulse 60, temperature 106·2, respiration 42, exhibiting similar symptoms to the other. Gave aperient pill, Aloes Barb. 5 drs., and Pulv. Zinzib. 1 dr., Acid Carb. 1 dr., repeated every three hours. 10.30 a.m.—Appears easy but dull, and refuses all food. 17th August, 1888, 6 a.m.—Patient no better, uneasy, pulse 42, temperature 104·2; Acid. Carb. repeated. 6 p.m.—No improvement, temperature 106, bowels not responded; raining hard, blankets wet, and standings bad. Swellings in the pharyngeal region, also swollen lymphatic glands, grunting; treatment continued. 18th August, 1818, 6 a.m.—Temperature 105, pulse 44, throat more swollen, eating a little. Acid Carb. and Sodæ Bicarb. given; great difficulty in respiration, so much so that I performed tracheotomy. At 11 a.m.—Patient seemed to rally after this, but only to suddenly become worse, and died about 3.30 p.m. Discharged died.

Post-mortem Examination.—External manifestation.—The natural openings everted and the living membrane of the rectum deeply injected; great swelling in the pharyngeal and laryngeal regions. The abdominal cavity contained only a little exudate, but extravasations were observed throughout. The spleen was only a little enlarged, but of the characteristic colour, and slightly nodulated. The peritoneum and mesenteries were deeply stained. Stomach presented the usual anthracoid appearance, and contained little or no food. Liver and kidneys exhibited a congested appearance. On opening the thoracic cavity a great quantity of yellow exudate was observable. Lungs congested and ecchymosed, pleuræ studded with dark markings, great œdema of the glottis, which was deeply infiltrated with serosity, presenting a gangrenous appearance, which extended round the point of operation of tracheotomy. Microscopic examination of the blood exhibited the Bacillus Anthracis.

Case VI.

Subject.—Iron grey Persian entire, aged six years. Case 544, B 5, 16th August, 1888—Anthrax. Admitted at 7.30 a.m. Dull and depressed look, pulse 62, respiration 32, temperature 105, breath fœtid; lips pendulous; eyes glassy, and presented very many similar symptoms to the others admitted. Treatment con-

sisted in giving an aperient pill and Sodæ Bicarb. with Acid Carb. every three hours. 10.30 p.m.—No better; treatment continued. Temperature 106·1 at 7.30. 17th August, 1888, 6.30 a.m.—Swellings round the throat, discharge of a greenish colour from the near nostril. I extracted blood from subject, and upon placing some under the microscope, spores of the Bacillus Anthracis were distinctly visible. Am of opinion horse will not recover; colic pains increased; pharyngeal region more swollen, only soft to the touch; free yellowish green discharge from both nostrils. Temperature 104·4 at 6 p.m. 18th August, 1888.—Pulse 44, weak, temperature 103·1. At 9 a.m.—Mucous membranes deeply injected; swelling increased; dull, but quiet; discharge from both nostrils continues; treatment has been continued. 6 p.m.—Temperature 106. Swelling of the throat increasing and cannot take any food; tries hard to drink water, and only manages to take a mouthful now and again; hanging his head; does not lie down, and appears worse. Raining hard. 19th August, 1888.—Temperature 102·2. 10.30 a.m.—Horse still standing, but cannot last much longer; nostrils greatly dilated. Gave Ammon. Carb. 2 drs., Hypo. Sulph. Soda 1 dr. 6.30 p.m.—Temperature 104; no improvement; treatment continued. 20th August, 1888.—Horse much worse; died at 4.30 a.m. Discharged died.

Post-mortem Examination.—External appearances.—Great anthracoid swellings in the pharyngeal region, also in front of the chest; discharge of thick yellow-coloured fluid from both nostrils; mucous membranes of a deep salmon colour; crepitation throughout the skin. Upon opening the thoracic cavity a great amount of serosity was to be seen, the pericardium was ecchymosed, and the pericardial fluid extensive. *Heart* not firm to the touch, feeling quite flabby, and dark stainings were present upon the walls of its cavities; the large vessels contained tarry-looking blood, pleuræ ecchymosed, and the lungs presented a congested appearance, nodulated, and stained with dark blood colourings; much effusion was present around the base of the heart and root of the lungs. Deep yellow infiltrations were found along the course of the trachea, which exuded upon incision, the skin around the parts appearing semi-detached. The peritoneal cavity presented a somewhat less virulent appearance, but contained a certain amount of serosity; the peritoneum and mesenteries were infiltrated, and the large blood vessels exhibited a peculiar blue aspect. *Spleen* of its normal size, bluish and nodulated. *Liver* congested and friable; large and small intestines of a deep red colour. *Kidneys* congested and surrounded by a considerable amount of exudation. The lining membrane of the stomach was congested and deeply stained.

Case VII.

Subject.—A grey Persian entire, aged six years. Case 545. B 16, 16th August, 1888—Anthrax. Admitted at 7.30 a.m. One of the first in B Troop to show symptoms of illness; pulse 66; respiration 34; temperature 107·2; mucous membrane pale yellow; drooping ears and lip; abrasions on gums; breath fœtid; dull, and showing Colic pains. Gave aperient pill. 10.30 a.m.—Horse much the same. Gave Sodæ Bicarb. and Acid Carb. 17th August, 1888.—Pulse 48, temperature 104·4; aperient operated and horse appears somewhat better. Gave Sodæ Bicarb. ½ oz. at 6.30 a.m. 12 a.m.—Looking much sharper; has been eating a little all day. 6 p.m.—Temperature 106. 18th August, 1888, 6 a.m.—Temperature, 105·2; pulse 46; dull; no smellings; eating little; may pull through; treatment continued. 6 p.m.—Temperature 106; still much the same; eating; this horse has been like this since admission, and has not shown an acute period. 19th August, 1888, 10 a.m.—Temperature 104·3. Patient appears much the same. Gave Ammon. Carb. 2 drs., Sodæ Hyposulph. 1 dr. 6 p.m.—Temperature 104·2; horse appears to have had a relapse; treatment continued. 20th August, 1888.—Much worse; cannot recover; died at 9.50 a.m. Discharged died.

Post-mortem.—Intestinal Anthrax—Abdominal cavity contained an enormous quantity of serous exudate in which were floating about a number of filaria papillosa similar to horse B 22. The mucous membrane of the gastro-intestinal tract was softened and of a deep colour, more especially the pyloric portion of the stomach. The mesenteries were covered with ecchymosed spots, the large veins of the intestines being distended, with blood of a dark colour. Charbonous tumours were present in the sub-lumbar region, containing a serosity of a yellow colour; decomposition was most rapid, rectum everted, and peritoneum studded over with dark spots. There was also observed a large charbonous tumour in the scrotum, completely enveloping both testicles. *Spleen* enlarged slightly, of the peculiar blue aspect; nodulated and felt quite flabby upon manipulation; a slight rupture was seen upon its surface. *Liver*, right lobe of a peculiar yellow colour; the remainder of the organ was dark and appeared congested; small abscesses were present upon the surface of the right lobe; upon incision, blood of a dark colour freely escaped. Nothing more than ecchymoses of the pleuræ and the presence of a certain amount of serosity were detected in the thoracic cavity. No external tumours were present. The blood revealed the presence of the Bacillus Anthracis.

Case VIII.

Subject.—A grey Persian gelding, aged eleven years. Case 546, B 49, 16th August, 1888—Anthrax. Admitted at 10.30 a.m. Off feed; dull and uneasy; extremities cold, and appears similar to others admitted; pulse 41; respiration 38; temperature 102·3. Gave aperient pill and followed by Sodæ Bicarb. ½ oz. 10.30 p.m.—Much the same, Sodæ. Bicarb. continued. 17th August, 1888.—Looking a little better, but still refuses food; bowels responded to aperient; removed him to top of hill, a little distance from the others, at 12 a.m. 6 p.m.—Much the same; temperature 103. 18th August, 1888.—Temperature 106·3; pulse 41 at 6 a.m. 5 p.m.—Temperature 101·2; eating a little; treatment continued. 19th August, 1888, 10 a.m.—Temperature 99·4; appears better; no relapse has yet taken place. Gave Ammon. Carb. 2 drs., Sodæ Hyposulph. 1 dr., repeated at 1 p.m. At 6 p.m.—Temperature 101·3; appears much the same; treatment continued. 20th August, 1888.—Temperature 101·3; pulse 36; much the same. 6 p.m.—Temperature 101·3; doing well. 21st August, 1888.—Temperature 101·3 in the morning; 6 p.m.—Temperature 101·1. 22nd August, 1888.—Temperature 99; pulse 46; 4 p.m.—Temperature 101·1; eating lucerne; doing well. 23rd August, 1888, 9 a.m.—Temperature 100; 6 p.m.—Temperature 101·1; pulse 42; treatment discontinued. 24th August, 1888, 9 a.m.—Temperature 98·1; 6 p.m.—Temperature 101·2. 25th August, 1888.—Temperature 99·2; 5.30 p.m.—Temperature 101. 26th August, 1888, 7.30 a.m.—Temperature 99·3; 6 p.m.—Temperature 100; doing well; eating regular feed. 27th August, 1888.—Doing well; no further treatment necessary. 7th September, 1888. Discharged cured.

Case IX.

Subject.—A grey Persian entire, aged six years. Case 547, B 21, 16th August, 1888—Anthrax. Admitted at 2.30 p.m. Patient was taken out of lines looking dull and showing Colic pains; temperature 106, pulse 56, respirations 50; perspiration profuse. Gave aperient pill, Sodæ Bicarb. and Acid Carb. 4 p.m.—Horse much worse. 10 p.m.—Laboured breathing; temperature decreasing; will die; greatly distressed appearance. 17th August, 1888.—Horse died at 7.30 a.m. Discharged died.

Post-mortem.—Intestinal Anthrax.—Great swelling of the abdomen from accumulation of gas in the gastro-intestinal canal; rectum everted and blood escaping from the same; mucous membranes of the mouth and nose covered with ecchymoses. Upon

incising the abdominal cavity a great accumulation of the peculiar serosity was observed; the peritoneum presented a spotted appearance; extravasations of the small and large intestines; the mucous membrane of the gastro-intestinal canal was thickened, soft, congested, and easily broken down; in some portions great sears were to be seen; decomposition was rapid. The mesenteric glands swollen and infiltrated with the characteristic exudate. *Liver* presented a congested appearance, and upon incision blood ran out of the nature of tar; the large abdominal vessels were also full of blood of a similar nature. *Spleen* not much enlarged, weighing only 2½ lbs., but presented a nodular bluish appearance. *Kidneys* much congested and contained a quantity of serosity in the pelvic cavities. *Bladder* congested and contained urine of a treacly consistency. Nothing very characteristic was noticed in the chest or pharyngeal regions, except a general yellow staining around the various lymphatic glands. The direct seat of the disease seemed to be confined to the abdominal cavity.

Case X.

Subject.—A grey Persian gelding, aged six years. Case 548, B 25, 16th August, 1888—Anthrax. This horse was admitted at 4 p.m.; off feeding; blowing; general drowsiness and dull looking; eyes staring; ears drooping, and twitching of the lower lip, and many other symptoms similar to the others, but perhaps not so severe; temperature 104·2, pulse 51, respirations 34. Gave aperient pill, Sodæ Bicarb. Tinct. Aconite. 10 p.m.—Temperature 104. 17th August, 1888, 6.30 a.m.—Temperature 103·2; looks lively and sharper; pulse 42; had been removed a little distance from the others. 6 p.m.—Much the same; temperature 103·4; medicine repeated, Sodæ Bicarb. ½oz. Tinct. Aconite 20 min. 18th August, 1888.—Temperature 102·1, pulse 39; doing well; eating all food; bowels responded to aperient. 6 p.m.—Temperature 101·3; appears no worse. Gave Sodæ Hyposulph. 19th August, 1888, 10 a.m.—Temperature 99·3; improvement, and should make a recovery. 6 p.m.—Temperature 102; patient appears to have a relapse; treatment continued. 20th August, 1888.—Temperature 102·1, pulse 44; much the same. 6 p.m.—Temperature 102·1; treatment continued. 21st August, 1888.—Temperature 99·3; some improvement. 6 p.m.—Temperature 100, pulse 40; doing well. 22nd August, 1888, 6 a.m.—Temperature 98, pulse 42. 4 p.m.—Temperature 100·3; treatment continued. 23rd August, 1888.—Temperature 100; eating lucerne and half diet food; doing well. 6 p.m.—Temperature 100, pulse 40. 24th August, 1888.—Temperature 99·1.

6 p.m.—Temperature 100·2, Sodæ Bicarb. ½dr. 25th August, 1888, 6 p.m.—Temperature 98·3, Sodæ Bicarb. ½oz. 5.30 p.m.—Temperature 100·2. 26th August, 1888.—Temperature 100·1, pulse 40. 7.30 p.m.—Temperature 100·1, pulse 38; doing well. 27th August, 1888.—Improvement; no further treatment necessary. 3rd September, 1888.—Doing well. 7th September, 1888. Discharged cured.

Case XI.

Subject.—Grey Persian entire, aged six years. Case 549, B 4, 16th August, 1888.—Anthrax. Admitted at 7.30 a.m. Temperature 105·2, respirations 48, pulse 44; mucous membranes yellow; off feed; dull and uneasy, but hardly exhibiting such acute pains as some others admitted. Lips, ears, and eyes of the characteristic nature; nostrils dilated; extremities cold. Aperient pill was given followed by Sodæ. Bicarb. every three hours. 10 p.m.—Much the same; medicine repeated. 17th August, 1888, 6 a.m.—Pulse 36, temperature 104. Gave Acid Carb. alone. 12 a.m.—Looking brighter, Sodæ Bicarb. 6 p.m.—Temperature 103·4. 18th August, 1888.—Temperature 102·4, pulse 39; throat somewhat swollen; no discharge; bowels responding freely to aperient; treatment continued with Hyposulph. Sodæ. 6 p.m.—Temperature 102·1; does not appear any worse; treatment continued; eating a little. 19th August, 1888.—Temperature at 10 a.m. 103·3; increased, but horse does not show any other signs of becoming worse. Gave Ammon. Carb. 2 drs., Sodæ. Hyposulph. 1 dr., and repeated. At 6 p.m.—Temperature 101·4. 20th August, 1888.—Temperature 101·4, pulse 34; much the same. 6 p.m.—Temperature 101·4; improvement; eating. 21st August, 1888.—Temperature 100; continues to improve; throat still swollen. 6 p.m.—Temperature 101·2, pulse 40; doing well; slight discharge from near nostril. 22nd August, 1888, 6 a.m.—Temperature 100, pulse 36. 6 p.m.—Temperature 101, pulse 40; eating. 23rd August, 1888.—Temperature 100·3, pulse 42; appears to be doing well; eating half diet and lucerne; should make a recovery. 6 p.m.—Temperature 100·2. 24th August, 1888.—Temperature 97·4. 6 p.m.—Temperature 101·2, Sodæ Bicarb. 25th August, 1888.—Temperature 100·2. 5.30 p.m.—Temperature 100·2. 26th August, 1888, 7.30 a.m.—Temperature 100·4; evening temperature 100; doing well. 27th August, 1888.—Improvement; no further treatment necessary. 9th September, 1888.—Discharged cured.

(*To be continued.*)

Editorial.

MEAT INSPECTION.

The subject of meat inspection has been very much neglected in this country, but there is evidence that it is at length attracting attention, and that circumstances will tend before long to bring it very prominently under notice. It is regrettable, but not very remarkable, that little, if anything, has been done in this direction to safeguard the health and interests of the public. The killing of animals and dressing of their flesh for human consumption, in private slaughter-houses, has long been a grave scandal, while the fact that there was absolutely no guarantee that the animals were healthy was always a source of serious apprehension to the sanitarian. There are diseases, parasitic and others, which, under certain conditions, render the flesh of creatures affected with them very dangerous to those who consume it. This is more apparent to the veterinary surgeon, perhaps, than to any other member of the community, and though for years he has been doing his utmost to call attention to the matter, it is only lately that its seriousness has been perceived, and the question of adequate protective measures has begun to be discussed.

The necessity for public abattoirs in every town, or, at least, rigid slaughter-house inspection, has long been insisted upon. Not only should these places be kept in a proper condition, but the health of the animals killed in them, and the fitness of their flesh for food, should be carefully noted.

On the Continent public abattoirs are the rule, and the way in which they are conducted is a guarantee of safety to the people, as well as a valuable source of information with regard to the prevalence of disease among the animals killed in them. It is needless to add that everything relating to these abattoirs, as well as the inspection of meat, is in the hands of officially appointed and thoroughly competent veterinary surgeons, who alone are considered fit for this duty. That such should be the case in this country there can be no doubt whatever, though if we may judge from the opinion expressed in the *British Medical Journal* of July 27th, the members of our profession in these islands are not yet in a position to undertake the functions so well discharged by their colleagues elsewhere. "Individual members of the veterinary profession," our contemporary admits, for a wonder, "have made most valuable contributions to the literature of Tuberculosis, but as was only too apparent from the nature of the evidence tendered at the trial at Glasgow, especially that on behalf of the defence, the veterinary surgeon is not as a rule the man best qualified to judge as to the fitness of carcases for human food."

We have only to refer to the report of the Glasgow trial to discover that some of the medical witnesses were far less trustworthy, and gave far more absurd opinions with regard to Tuberculosis, than did one or two of the veterinary witnesses. Our generous contemporary

goes on, "Enormous strides have been made in recent years by the veterinary schools, not only in the completeness of their course and the thoroughness of their teaching, but in the character of the qualifying examination, and it is not going too far to say that the next generation of veterinary surgeons will be fully competent to undertake the duties assigned to them in the above recommendation; but for the present it is to be feared that, with few brilliant and outstanding exceptions, they do not possess the necessary qualifications. We are sorry to write this, for we do not think that such work falls within the province of medical officers of health. Their duties and responsibilities are already sufficiently onerous, but, except in large teaching centres, they are the only men who are at all able to give a reliable opinion."

We venture to express the opinion that the *British Medical Journal* knows little of, or ignores the competency of veterinary surgeons for such work; at least, for many years we have remarked the indifference or neglect with which it has treated veterinary subjects, and, as in the present instance, its tendency to sneer at or depreciate the work done by our colleagues. This we can well afford to overlook when it only affects us as a body; but when it imperils the public health and wealth we should consider ourselves blameworthy if we did not protest against the *dictum* pronounced by the journal in question, and maintain that veterinary surgeons only are capable, by their training and experience, to be inspectors of the flesh of animals intended for food. This fact has been fully recognised and acted upon in countries in which human medicine occupies as high a position as in the United Kingdom, and our members are assuredly as well fitted now for discharging such a responsible duty as their Continental colleagues. We trust they may soon have an opportunity of proving how much the *British Medical Journal* has disparaged them.

EPIZOÖTY OF HERPES EPILANS.*

BY MM. DELAMOTTE AND BOGENEZ.

THIS epizooty was observed among the horses of a regiment of Dragoons at Montauban. It began after the arrival of remounts, spread rapidly, and lasted five and a half months, during which 280 animals were attacked. The disease usually began with a papulous eruption on the rump, over the loins, the back, and the sides of the neck and shoulders. The papules, as large as a half-franc piece, were hard, convex, and slightly conical. Some of them were as large as a two-franc piece, but flat, not convex. Their evolution lasted from one to six days. The hair stood erect and finally fell off. After the disappearance of the papules, only a yellowish scab remained, which soon fell off, leaving a bare and slightly irregular surface, which was humid and always without hair. In the worst cases, the scabs were large and thick, covering ulcerated and moist patches. When the horses were otherwise in good condition, the disease cured itself almost spontaneously in fifteen days; but on certain more or less weak subjects it tended to spread and last. The treatment employed for these last was, shaving the diseased parts,

* Translated by R. W. B.

rubbing off the scabs, and touching the herpetic patches with a solution of sulphuric acid. Usually, judicious measures of disinfection sufficed to prevent the spread of the disease.

This disease is produced by the *tricophyton epilans*, a fungus of the same order as the *tricophyton tonsurans*, and its active propagation explains the contagiousness and tenacity of the disease which it gives rise to. In the first disease the layers are numerous, irregular in shape, slightly humid, and always without hair. In the second, the scabs are quite circular, never numerous, always dry, and covered with short, stumpy hair.—*Recueil de Med. Veterinaire.*

Antirabic Properties of Sol. Pilocarpine.

BY M. NOCARD, DIRECTOR OF THE ALFORT VETERINARY SCHOOL.

Professor Mocard, Director of the Alfort Veterinary School, recommends subcutaneous injections of pilocarpine in Rabies. He has used it in doses of 1 to 4 centigrammes, injected under the skin of the tail, in the dog. He has had recourse to this treatment in the horse with the same success. M. Nocard injects, in solipeds, in doses of 12 to 16 centigrammes in each injection.—*Recueil de Med. Veterinaire.*

Treatment of Tetanus by Intra-Muscular Injections of Chlorhydrate of Cocaine.

BY A. VILLA, OF CREMA.

The patient under observation, a colt a year and a half old, exposed to intense cold ten days after castration, was attacked with very severe Tetanus. Encouraged by my successful use of cocaine in the reduction of inguinal hernia, I wished to use it in the reduction of trismus, the most severe symptom of Tetanus. I injected into each masseter, in different places, two injections of chlorhydrate of cocaine. During the evening of the same day I repeated the same operation (chlorhydrate of cocaine, 1·20 gramme in 8 grammes of distilled water; 1 gramme = 15½ grains, Eng.). And also as an adjuvant I gave a subcutaneous injection of ½ gramme of the acetate of morphia. Next morning the muscular rigidity had much diminished, and the animal had taken some food. Encouraged by this first success, the author gave two more injections in four places, along the sterno-maxillaris, with a solution of two grammes of cocaine. The operation was repeated three times at intervals of twelve hours. Two days after, the tension of the neck had diminished and permitted lateral movements of the head. I then ceased to use cocaine, and substituted curare and pilocarpine in hypodermic injections, and chloral by the mouth and by means of clysters. A complete cure was obtained.—*Recueil de Med. Veterinaire.*

Treatment of Traumatic Erysipelas by Resorcine.

BY R. KUFFNER, OF MONACO.

Resorcine can be employed in Erysipelas in three different forms: in subcutaneous injections; as a lotion (*lavages*); and as an ointment (pommades). This last method, tried by Andeer, Cattani, Moncorvo, Unna, and many others, is preferable to using watery solutions, which produce an astringent effect on the tissues and render absorption difficult. As to subcutaneous inoculations, they give uncertain results, and if used strong, leave disagreeable scars. A mare seven years old presented very evident Erysipelas at the back of the left foot, following a kick. At different points excavations had been produced, some covered with scabs, others moist and suppurative. The animal avoided putting its foot to the ground. The skin appeared tight and inflamed, and was painful. The excoriated parts were washed, and

resorcine ointment was applied to the diseased parts. Next morning there was no noticeable improvement; the application was repeated. On the fourth day there was a sensible improvement, and the scabs at the excoriated points had fallen off. On the fifth and seventh days, friction was employed and a bandage put on. The cure was effected in thirty-five days. There were two other similar cases.—*Recueil de Med. Veterinaire.*

PRELIMINARY REPORT OF THE BOARD APPOINTED TO MAKE FULL INQUIRY INTO THE ORIGIN AND NATURE OF A PREVALENT DISEASE AFFECTING STOCK, COMMONLY KNOWN AS "MANGE," IN QUEENSLAND.

To the Honourable the Colonial Secretary.

SIR,—In accordance with the instructions issued to us on the 14th March, we have the honour to submit the following Preliminary Report, premising that we are moved in doing so thus early in the progress of our investigations —firstly, by reason of the consideration that certain important facts bearing on the nature of the disease in question are already at our disposal to communicate; and secondly, since publicity has been given to what we feel bound to regard as exaggerated statements relating to its general character, which, unqualified, are calculated to detract from that reputation which the stock of the colony has already gained in other parts of the Australian continent. Immediately after receiving your instructions it was decided that an early opportunity should be taken of inspecting some of the affected stock of the West Moreton District, and it having been brought to our knowledge that typical illustrations of the disease existed in plenty in the vicinity of Harrisville, that township was in the first instance visited. Arriving there, then, on the 14th March, operations were commenced early on the following day with the close examination of a number of affected horses, made in order to gain acquaintance with the general character of the disease, to detect if present the existence of a minute insect previously reported as constituting one of its exciting causes, and to notice the effect if any of certain agents which had been employed with a view to its eradication. On the 14th March, also, a journey was made to Obum Obum for the purpose of seeing a small flock of sheep in which the existence of a disease supposed to be identical with the one affecting horses had been previously brought to light. Whilst proceeding thither, too, some cattle evincing symptoms of an affection of the same nature also came under observation. The sheep at Obum Obum were reported to have formed a portion of a flock which had travelled from Cambridge Downs, in the Flinders District. They had been shorn after 1st January, 1888, and the disease was first observed in them by their present owner on the 11th February. When seen by the Chief Inspector of Stock on 15th February, about 30 per cent. were more or less affected—the majority, however, very slightly so. On the day on which they were examined by us the percentage of affected individuals had considerably increased. Grazing with these sheep were several hundreds that had been shorn in August, 1887, and consequently carried at the time of our visit a fleece of seven months growth. None of the latter appeared to have shown symptoms of the disease It was also brought prominently to our notice that all the sheep that were affected were such as had very open fleeces; whilst those in which the wool was more dense and that had developed a considerable supply of yolk were free from any outward signs of the disease. In order to determine whether the condition of the animal, as displayed by *post-mortem* examination, would throw any light upon the origin of this disease, an autopsy of a sheep on

which it had manifested itself to an average extent was made by Mr. James Irving, and although a very searching inquiry was conducted, everything observed pointed to the conclusion that the animal was perfectly healthy.*

Here Mr. Tryon obtained material for future investigation into the nature of the disease as it affected sheep.

Both at Obum Obum, as also at Harrisville, the condition of the pasture engaged the attention of Mr. F. M. Bailey, and from his observations he was led to regard the indigenous grasses and other fodder plants in both these localities as being not only abundant, strong, and healthy, but also exceptionally free from fungus blight. He, however, remarked that the fungus—*Sphærella destructiva*, B. and Br.—was very thick on lucerne supplied to horses in the Harrisville District. It could not, however, be inferred that this fungus exerted any toxic influence on the stock which thus consumed it.

Messrs. Irving, Gordon, and Tryon having returned to Harrisville, they there held an informal conference, at which a form of circular drawn up with a view to elicit information on the subject of the disease from residents in different parts of the colony was adopted.

This circular we have the honour to submit as an Appendix to this Report.

The Board, with the exception of Mr. Tryon, who remained in the Harrisville District until 21st March, returned to Brisbane on the 16th day of that month.

Mr. Tryon on that day visited both horses and cattle subject to the disease in the Rosevale and Mount Walker Districts, and also commenced a series of investigations into its nature and origin, having meanwhile procured examples of living tissue from different classes of stock affected by it.

The results arrived at by Mr. Tyron thus early in the prosecution of his work are recorded in the accompanying Special Report. These conclusions briefly summarised are as follows:—

1. The disease in horses, cattle, and sheep is one and the same.
2. It is confined to the cuticle, or scarf skin, and the hair, and does not extend into the cutis or true skin itself, although it occurs in the roots of hairs which penetrate it.
3. Other deeper lesions, very generally met with, are secondary occurrences only, and not necessarily connected with the presence of the disease.
4. Its occurrence is invariably associated with the presence of a minute fungus, allied to *Trichophyton tonsurans*, which exists especially in the "stroma" state. This is met with in immense numbers in every part implicated in the disease, and may be cultivated separately from it.
5. This minute fungus is the cause of the affection, which, therefore, must be regarded as a vegetable parasitic disease.
6. The disease being of this nature is theoretically contagious, although natural checks may ordinarily occur to mitigate the full influence of its contagious nature.
7. The principle of contagion, viz., the minute sporule of the fungus, is constantly disseminated by the diseased animal itself.
8. This disease exists in this Colony in an epidemic form.
9. It is neither a novel skin disease, being one which has occurred amongst stock in different parts of the world, nor is it of the nature of Mange. The term "Queensland Mange" is, therefore, altogether inappropriate.
10. Its presence in no wise affects the wholesomeness of the flesh of animals, which are otherwise suitable for the butchers' requirements, nor does it necessarily lessen the value of their hides.

* As far as at present known, this instance of the disease affecting sheep is a solitary one.

11. The peculiar form which the disease takes in sheep is due to the anatomical relation between the wool and the skin being different from what subsists between the latter and the hair in other classes of stock.

12. Though in sheep the wool and cuticle are shed as a result of the presence of the disease, the skin is not permanently injured, it having already developed a new cuticle and rudimentary wool fibres.

13. The treatment indicated is that available in cases of skin diseases due to the presence of related vegetable parasites.

14. Over-treatment, and especially the use of materials not indicated by the nature of the disease as giving rise to secondary pathological conditions, are especially to be deprecated.

We concur in these deductions based on Mr. Tryon's investigations, which are still in progress. Meanwhile, amongst other inquiries connected with our commission, we are directing our attention to the discovery of a remedy with which most expeditiously to combat the disease.

As far as can be at present ascertained the geographical range of the occurrence of the disease, as deduced from reports which have been made to the Chief Inspector of Stock, are as follows:—Along the coast watershed from south of the Tweed River in New South Wales to the York Peninsula; in the country having a watershed to the Gulf of Carpentaria; on the Barcoo; the Thomson Rivers; Birdsville on the Western border of the Colony, and on the southern border westward as far as the Maranoa.

At present we do not feel justified in urging the adoption or creation of any legislative measures with a view to check the further incursion of the disease, seeing that it is already so widely distributed in the Colony.

We have, etc.,

James Irving, M.R.C.V.S.L.
Henry Tryon,
Assistant Curator, Queensland Museum.
F. M. Bailey, Colonial Botanist.
P. R. Gordon, Chief Inspector of Stock.

Brisbane, 24*th March*, 1888.

Special Interim Report on the Origin and Nature of a Disease at Present Existing amongst the Stock of the Colony and commonly known as "Mange."

by henry tryon, assistant curator, queensland museum.

Horse.

Seat of the Disease.—In a typical example of an affected horse the disease occupies the following situations, being more or less continuously distributed over the parts mentioned—from the forehead right along the top of the neck and centre of the back to the root of the tail, and thence along the external aspect of that organ, occurring with greatest virulence on the forehead, wither, croup, and at the root of the tail. Laterally it reaches downwards to a considerable extent, especially on the wither, shoulder, and ribs. Thus it sometimes occurs half-way down the sides of the neck nearly to the knee (elbow) joint, or to the point reached by the saddle flap. The ears, too, are often completely occupied externally by the disease. It occurs not only on parts covered by a temporary growth of hair annually shed and renewed again, but in others where, as in the case of that of the mane and of the tail, the hair having persistent bulbs is of perennial growth. The extent of surface involved by the disease depends on the time which has elapsed since its onset, and during its progression patches increase in size by peripheral encroachment on previously sound places, with or without coalescence with other patches of

affected surface, accordingly as these are present or otherwise. Thus the outline defining the limit of the disease is a very irregular one.

Onset.—The first indication of the presence of the disease is found in the occurrence of slight swellings of low elevation, similar in appearance to the weal occasioned by the attacks of certain insects. These obviously can only be remarked in situations where the hair is short, and so escape notice when they arise on parts occupied by the mane, etc. If the surface of the cuticle is exposed at these spots, and the small weals be squeezed with some force, a minute drop of serous fluid generally arises at a single point, and thus indicates an initial lesion of very circumscribed area, a concentrated presence of an irritant at one spot. Later on this liquid exudes of its own accord, and, together with the cuticle cells immediately adjacent, which exfoliate, forms a tiny scab scarcely larger than the head of an ordinary pin, and this may persist for some days. Around the centres which thus arise, small spots, of the size of a pea to that of a sixpence, on which the hair is more or less completely shed, gradually develop. These spots may in some cases, and especially when they occur on the sides of the neck, remain isolate for some considerable time, but generally they coalesce to form patches. On the skin from which the mane arises, the inflammatory product early produced, elsewhere to so limited extent, not being able to exude upwards, and so escape, may increase in quantity, and thus occasion at this spot a kind of pustular eruption.

General Characters.—The parts affected by the fully developed disease present the following characteristic appearances:—Where the hair is naturally short the general surface has a greyish colour, this hue being due to the presence on such hair as is still remaining of a very fine dust-like substance, consisting of minute fragments of cuticle or scarf skin. The greater part of the hair itself is shed, and that which remains is much altered in condition. Instead of sloping downwards from its origin it now stands almost erect; it is also variously bent or twisted—the free extremities pointing in various directions. When plucked out the individual hairs will be found to have broken off short, or if the hair-bulbs still persist these will be found to have swollen and lost their usual symmetry of form, or to be small and rough. Moreover, a certain degree of constriction at the union of the hair-bulb and shaft generally accompanies the other changed conditions. The hair also is shorter and stouter than is normally the case, and may be of a somewhat lighter shade of colour. These appearances of the hair-bulb are exaggerated in the case of the mane and tail. Within the boundary of the area occupied by the disease, islands may occur of still unaltered hair, which have been included by the spread of the affection, but the limits of these are ill-defined, and as the malady invades them they also gradually lose their distinctive characters.

The mane puts on a very distinctive character—a great part of its component hair, as likewise also is much of the hair of the affected part of the tail, is shed. What remains breaks off at different lengths, so that a very peculiar hog-mane of irregular jagged outline is produced—a feature more pronounced in the hinder portion as the wither is approached. The hair at the root of the tail also, where not shed, is broken off shortly, and stands out in a quaint manner.

Everywhere at the roots of the hairs much scurfiness is produced. The free particles of scarf-skin form the dust previously alluded to; but much exists as small chaffy scales, with free borders still adherent to the subjacent layers of the epiderm. There is also a slight general swelling of the affected parts. The ordinary pliableness and motility of the skin being interfered with by the presence of so much dry and desquamating epidermis, numerous wrinkles and folds are produced, the latter being intensified by the attitude which the

horse, when not feeding, assumes under the incubus of the disease, as if directed to the continuance of a reflex action by the experience of relief from distressing symptoms which it doubtless occasions.

The folds are most conspicuous on the sides of the neck and on the withers, in which position they have a transverse disposition. They extend right across the mane and cause its free border to have a coarsely serrated outline. They are largely obliterated by depression of the head. The smaller irregular wrinkles extend over the whole surface of the affected area, being more pronounced where the disease is of longest duration.

Secondary Characters.—The chief local secondary results of the presence of the disease are excoriations of greater or less depth and extent, occasioned in the efforts to gain relief from the intense itching which it occasions. These are perhaps the worst feature of the disease and give rise to the raw and crusted patches in the bodies of affected animals, and the scabs which are ignorantly regarded as being directly associated with the affection. They are really only formed by effusions of serous fluid, afterwards consolidated as in ordinary skin abrasions. Sometimes, however, and especially as is commonly the case when these injuries occur on the wither, inflammatory products may be developed in considerable quantities, and more serious lesions arise from the burrowings of the resultant purulent fluid in its efforts to escape.

The chief constitutional results are an impairment of the condition of the animals affected, which become too restless and worried to take their food in ordinary quantities. This may show itself in various ways: horses which previous to being attacked by the disease were plump and hale become very poor, notwithstanding an abundance of fodder is at their disposal; fat bullocks may also fall away to nothing, and working bullocks be incapacitated from service. These results would no doubt be very much exaggerated were the seasons in which the disease occurred, otherwise than from a pastoralist's point of view, exceptionally good. Animals, however, do not invariably lose condition if possessed with such a temperament as will occasion them to feed, notwithstanding the annoying presence of the disease. It is satisfactory, however, to be able to confidently state that in the case of animals otherwise suitable for the slaughter-yard the presence of the disease in no way affects the wholesomeness of the carcass, and is as little injurious in this respect as is the occurrence of a few scale insects on the rind of an orange in influencing the luscious quality of the fruit. Moreover, except where deep abrasions or similar lesions have been made, the hide is in no way depreciated in the eyes of the leather-dresser.

Morbid Anatomy.—If a thin section is made, in the ordinary way, of a portion of the skin taken from a diseased patch in a living animal, and be suitably stained and rendered transparent, it will, provided that the different layers are thus brought under observation, be plainly evident that the disease is an entirely superficial one, and that both the corium or true skin, the subcutaneous cellular tissue, and their various component elements, as well as the sweat glands which they contain, and even the malpighian layer of the epidermis, are entirely normal in their appearance. In fact, the pathological condition is entirely restricted in its occurrence to the superficial or horny layers of the epidermis (cuticle or scarf-skin) and those bodies which are special developments of it—namely, the internal lining of the hair follicle and the hair itself.

In the case of the epidermis, instead of the regular contour which should define this externally being brought under notice, individual cells will be observed that have been arrested in the process of exfoliating, and similarly semi-detached and altered cuticle cells will be seen packed within the interval in the funnel-shaped epidermal depression which exists between the hair which arises from this depression and the walls of the latter. The hair itself,

as will be seen especially on separate examination of it, will be found often to be of uneven breadth and to have one or more swellings in its course; the bulbous enlargement of the root may be shortened and rounded, and immediately beyond it, at its union with the stem, it may be constricted. The medulla or central marrow of the hair is usually wanting at the basal portion, and when it occurs is often interrupted at different points along the axis of the hair.* When hairs are plucked from a diseased patch of skin, they usually either break off short or the root sheath is ruptured, the outer root sheath being left in the hair follicle. Not unfrequently some of the cortical scales of the hairs become detached, and this is especially so where enlargements occur in the course of the hair, for at these spots the hair cuticle is usually broken across.

The most remarkable feature, however, in all these bodies is the presence of very numerous round granule-like particles or minute cells. These, as seen with an ordinary $\frac{1}{4}$ inch objective, occasion a clouded appearance, which may be made out as due to the presence of very minute objects. When cultivated apart or naturally occurring outside the structures which they infest, a high power of the microscope† brings to light the fact that they are really small round nucleated cells which occur singly in twos, or even in greater numbers, occasionally forming masses, and the component cells of these being apparently suspended in a gelatinous stroma, what are technically known as zoogloœa. These, then, occur in the outer cells of the epithelium, especially those which are being discarded and those which immediately surround the hairs as they emerge from the skin, within the cells forming the inner root-sheath of the hair, and in the hair itself, both in that portion which is below the skin and that which is free from it. Here they apparently exist beneath the cuticular layer both on and within the fibrous portion. In the hair they are especially conspicuous in that part in which the medulla is absent; to this they give a curious finely freckled appearance, the markings often extending in short lines, which may be resolved into their component granules by altering the focus of the microscope, parallel to the longitudinal axis of the hair. If portions of scarf skin which have been naturally shed or been torn off be rendered transparent after previous treatment with potash, they will, on examination with a high power, display the presence of these little round bodies in immense numbers within their component cells. So, also, will the minute scab-like body which is formed, as has been previously mentioned, at the very onset of the disease. In fact, these cellular particles are invariably present in every tissue element which is included within the operation of the disease.‡ In particles of affected tissue, other fungus elements having much larger dimensions are not infrequently met with. These are (1) round bodies which are merely isolated minute cells which have become unusually large and which in growth may by transverse division directly form septate elongate sporidia, with septa corresponding in number to the frequency with which this process of division is repeated. These sporidia are frequently attenuated at one extremity, and both they and their component parts have a double contour. At other times they grow into (3) jointed threads or mycelia which

* This condition of the medulla taken by itself does not seem to denote any abnormal occurrence.

† In this investigation a combination of Hartnack and Pragmonski's No. 3 eye-piece and No. 9 immersion objective were employed, as affording the highest magnification available.

‡ These minute bodies are quite distinct from the granules, pigmentary or otherwise, which naturally occur in the more deeply situated cells of the epithelium or those which exist within the cells of the medulla of the hair. Comparison with the granules usually regarded as of fungus nature contained in the cells of the epithelial lining of the mouth is instructive as showing the distinctive characters of those especially under notice.

may be branched, and have often their terminal articles separated by constriction as elliptical spores (*conidia*). This mycelium is also eventually double-contoured and of uneven breadth. The walls of these fungus elements, especially in mature forms, are much darker in colour than are the minute cells, which are of a light greenish yellow. The latter appear to be swarm-spores, and are probably produced within the conidia or other forms of spores mentioned. They are competent of independent multiplication—also by fission.

It is important to consider what are these small bodies whose presence is so symptomatic of the disease under investigation. Without a doubt they are what in the case of a disease familiarly known amongst ourselves, and found under precisely similar circumstances in the hair and epidermis of human beings, have been described as constituting the "stroma" condition of a class of fungi which "produce most definite lesions, perfectly characteristic in hairy parts," and are stated to undoubtedly occasion the various vegetable parasitic diseases generally referred to under the term "ringworm." The essence of the disease, then, consists in the presence of minute organisms in the more superficial cells of the cuticle, and in the hair and its follicles, which are modifications of it.

Symptoms.—In addition to those described under the heading of general characters of the disease, the presence of epidermis and hair follicles affected by the fungus and dying, or in a dead state, occasions a continuous itching or pruritus, which is no doubt augmented by a slight turgescence and inflammation of the true skin arising from the same cause. This irritation seems especially felt at night. A writer in the *Queenslander* (3rd March, 1888) describes it as "worrying the unfortunate animals most cruelly: so that they rub themselves against anything they come near; they roll in agony upon the rough ground; they stand together in couples, head and tail, as they do when the flies are troublesome, but, instead of depending upon the tails to switch off the bothering flies, as is their custom, they bite each other's skin." Wherever there are leaning trees or accessible overhanging branches in a paddock in which affected stock occur, these are worn by the constant rubbing against them of afflicted animals, which stand for hours in the vicinity of these instruments of relief.

Cause.—Notwithstanding that investigation plainly demonstrates that the disease is a purely local one, being confined to the cuticle of the skin, and the probability therefore that the cause is not of a general nature, it were perhaps expedient to reply to the suggestion, which finds favour amongst many stock-owners, that it is a "*blood disease.*"* Such a conclusion is based on such observation as the following:—"We bled from eight to ten different horses (some very badly infected), and found in every case that about nine-tenths of the blood was *diseased.* After the blood was allowed to stand about five minutes, we found that the greater part was of a watery *sickly nature*, while only a very small portion indeed was *pure blood.*" In the case of those who are acquainted with the physiology of the blood and the changes undergone in it upon its removal from the body, these may pass over such an assertion without comment, for the conditions presumably implied in the expressions italicised will carry with them their proper interpretation. Much of the suspicion with which, no doubt, the appearance of the horse's blood when withdrawn has been regarded, has been engendered by the occurrence on the surface of it of what, in case of ourselves and other animals, would denote that this blood had been taken from such as were infected with inflammatory disease. Allusion is made to the well-known "Buffy Coat." Now, this occurs normally in the blood of horses which are perfectly healthy.

* For a statement of this view, *vide* letter in *Queensland Times*, Ipswich, 31st January, 1887.

In a work which is usually regarded as the most advanced exposition of the science of human physiology, it is stated that: "If before coagulation the blood corpuscles have time to sink, as is usually the case with the blood of the horse, the upper layer of the blood clot consists solely of fibrin, without corpuscles, and is therefore white and of closer texture than the red portion; this is called the "Buffy Coat."* But, admitting nevertheless the possibility of a peculiar condition of the blood as being a cause of the disease, we must then regard this condition to consist in, say, an altered state of the blood due to the circulation in it of a specific poison, either derived from some extraneous source (the evidence as to the existence of which, in the case of the occurrence of the present disease, is not forthcoming), or generated within the organism itself through the failure of some viscus, such as kidney, liver, or spleen, to fulfil its proper function of excreting matter the continued presence of which in the blood would exert a toxic influence. Now, the *post-mortem* examination of an animal selected as a typical example of one affected did not disclose any organic lesion in these viscera, which inferentially, therefore, were in a normal state of functional activity, nor are any concomitant constitutional diseases, whose presence might not be suspected from *post-mortem* examinations alone, invariably present; moreover, the disease is not of such a class as might be attributable to such a cause. Further, the general alteration of the condition of the blood without giving rise to loss of vitality or at least serious constitutional symptoms is too monstrous an idea to be entertained, that is, excepting normal changes (1) such as occur during the progress of alimentation, and which, as far as the serum is concerned, have been made the objects of investigation by Messrs. Bizzozero and Sanquirigo, and (2) the increase of acid, but not necessarily of acidity, which arises during oxidisation processes. A great authority on skin diseases, the late Dr. Tilbury Fox, in the chapter of his justly famous work which deals with etiology, has remarked that "there is much readiness to ascribe disease to changes in the blood, but not to sufficiently recognise the influence of perversions in the inherent cell-life of the skin structures."† But, still, viewing its causation from the same point of view, we might nevertheless inquire: Is the disease likely to have arisen from poverty of blood or from surfeit? The condition of the animals affected and the general profusion of "feed" do not admit of entertainment of the first suggestion, and as to surfeit no ailment having such a character as the one under investigation is now known to be has ever been traced to such a cause. The condition of the pasture, also, as a contributing cause may be considered in this connection. It has been "suggested that they (the grasses) may be deficient in some of the essential constituents"; and a writer in the *Queenslander* of 17th March, 1888, quotes a great authority on veterinary science, but whose acquaintance with the physiology of plants is evidently very limited, to show how this may arise, "that the nitrogenous elements of plants are readily soluble in water and may therefore be removed by wet."‡ How removed? it may be asked, especially in view of the fact (the common property of chemists nowadays) that albumen is only removed from fodder by exposure to wet after the latter has been cut down, and when fermentation or decay has already set in; and that even the amides and nitrates—the most easily removed of the other nitrogenous constituents—are not separated at all under even exceptional atmospheric conditions when the grass or other fodder is still standing. But then, again, the pasture shows every evidence of being perfectly healthy, and the fact that horses which have not access to any growing fodder yet contract the disease

* "Elements of Human Physiology," by D. L. Hermann, Eng. Trans., p. 51.
† "Skin Diseases," London, 1873, p. 50.
‡ George Fleming in "A Manual of Veterinary Sanitary Science and Police."

militates against the idea of regarding it as a cause of it even if it were otherwise.*

The appearance of some kind of fungus or mould on the hairs and wool of affected animals, which it has been suggested may be related to a similar condition in the fodder, has escaped our notice, unless it be the dust composed of fine particles of epidermis previously alluded to. But, notwithstanding, admitting that one of the fungi which reside in dead hair or wool may have been observed, the inference that the disease "may be caused by some kind of mould (vegetable parasite) formed on the grasses that the animals feed upon, this mould by some means getting into the hair of horses and cattle and the wool of sheep," is untenable when the facts known concerning the habits of fungi in relation to their hosts are borne in mind. Moreover, where the disease has been especially prevalent, it has been noticed that the fodder has been wonderfully free from parasitic fungi. The only examples noticed at Harrisville—viz., *Helminthosporium Ravenellii* on the grass, *Sporobolus* and *Sphærella destructiva* on lucerne, relate to fungi too commonly consumed by stock and horses with immunity to allow of us supposing that under any particular circumstance they developed pathogenetic properties.†

The conclusion that "the disease is the result of heat and damp,"‡ arrived at by the Chief Inspector of Stock, Victoria, after perusing whatever reports on the affection were available to him, cannot be taken as referring to an exciting cause, for it must have occurred to Mr. Curr that the association of heat and damp was no uncommon event even in Queensland, and that previously when it did transpire, horses and stock had not been noticed to be diseased as a consequence of such a contingency. Climatic influences do certainly give rise to skin affections, but these influences are malarial in their nature, and the class of maladies whose presence they give occasion to does not include any one having the general characters of this stock disease.

The term "mange," an unfortunate misnomer, has no doubt prompted the venture of the opinion that this skin affection is directly due to the presence of an acarus. The existence of such an arachnid in connection with the disease was assumed by John Pottie, V.S., in a meaningless article—*i.e.*, since his main proposition is absolutely incorrect—on "The Mange Epidemic," which appeared in the *Queenslander* of the 4th February. In this he nonsensically writes of it being "some particularly shaped little insect, the movements of which are too minute for the human eye, but they can be seen with a good microscope"—as if movement and size were not both apparently intensified by magnification. A Melbourne correspondent in the same Journal, 3rd March, 1888, having characterised this article as "bald and worthless," Mr. H. J. Pottie sends a report on the subject to the *Sydney Morning Herald* (*vide Queenslander*, 21st March). Therein he narrates the actual discovery of an acarus whose presence characterises what he regards as the third form of the disease. He writes as follows:—"The third form is that in which there is a true parasite closely resembling the *Sarcoptis (sic)*. This insect is now mounted at Sydney Museum, and may be seen by scientists. To Dr. Littleworth (? Lightoller), of Ipswich, Mr. Pottie is indebted for this insect specimen." (*To be continued.*)

* A very good instance of a stabled horse being affected is afforded in a draught stallion, the property of Mr. Thomas Roderick, of Wilson's Plains. This horse is fed on hay and corn, never goes into a paddock; its exercise being taken in an ordinary stockyard.

† On the subject of the general nature of the prejudicial influences to be expected from the presence of fungi on fodder, see "Plants Poisonous to Stock—a Review," by Henry Tryon, p. 7, Brisbane, 1887.

‡ *Australasian* 17th March, 1888.

SOME CONTAGIOUS SKIN DISEASES OF THE HORSE.

BY WILLIAM ALSTON EDGAR, F.R.C.V.S., DARTFORD, PROFESSOR OF VETERINARY MEDICINE, COLLEGE OF AGRICULTURE, DOWNTON.

(*Continued from page* 113.)

Where chronic inflammations exist subsequent to treatment, a course of arsenic and iron will improve the tone of the skin, and daily dressings with a dilute aqueous solution of plumbi subacet. will be all the local treatment necessary.

Sanitary measures should be identical with those suggested in Ringworm.

The concluding portion of our subject—Phthiriasis—is generally dealt with by authors in a particularly summary manner, either from the difficulty of saying much about it or its assumed unimportance.

In rural practice, however, lousiness in horses is a constant source of annoyance to veterinarians and owners of stock. During the past winter pediculi have been almost a plague to horse-owners in some parts of Kent.

It is a common and absurd mistake to imagine—and singularly enough, most of our text-books support the theory—that pediculi only attack horses in insanitary stabling, and under conditions of poverty and neglect.

I have seen scores upon scores of the best agricultural horses in Kent attacked with the same readiness as those belonging to the nomadic individuals that wander from village to town, and are consequently exposed to every possible source of contagion.

A few months ago, in our practice, one owner—a very good horse-master—had seventeen horses attacked; the importance of the subject under such circumstances may be easily estimated, for not only do the animals thrive badly and lose their rest night and day, but the expense of effecting the destruction of lice in a large number of horses is considerable, even if the cost of chemical agents is left out of the question.

It is not a little remarkable that as each animal has its own specific acarus, so also has it a besetting pediculus—in some cases two or three species being guests to the one host; *e.g.*, man has the distinction of sheltering, on occasions, three species; the horse two, and occasionally a fellow boarder making a third; while many of the domesticated animals have two or more species.

By far the most common variety met with in the horse is Hæmatopinus equi. This group is represented in almost all the domesticated animals, at any rate in name. I have not met with this species in dog or sheep, but other observers have probably been more fortunate.

This is really the only truly parasitic species of the pediculi infesting our patients, as the other group, Trichodectes—also represented in all the domesticated animals, excepting, in my experience, the pig and cat—can only be regarded as a fellow-boarder, it having no anatomical convenience for attacking the tissues of its host, although, as will be subsequently shown, it can produce almost as much irritation as the formidable hæmatopinus.

I have included for comparison the pediculi commonly attacking man and the domesticated animals other than the horse, as it will be particularly interesting to know if, in the experience of our members, any of the species indicated are a cause of Phthiriasis on animals not forming the normal host.

In my own experience this transmission occurs only in the case of the horse, viz., Goniocotes from poultry, of which there are several cases on record.

The louse has the misfortune to belong to almost the lowest order of insecta, having only a very imperfect metamorphosis. Its large size, flat body, six pointed legs, terminating in well-developed hooks, and the body partially segmented at margins, distinguish it from any other form of parasite. The two groups, Hæmatopinus and Trichodectes, are differentiated chiefly by the former having a long pointed head, and proboscis armed with a delicate piercer

which enables it to puncture the skin for blood-sucking. In the latter the neck is short, the head somewhat triangular, in some species rounded.

When the pediculi or their eggs become lodged upon the skin, reproduction proceeds rapidly. Leeuwenhoek, in his experiments, found that two females produced 10,000 eggs in eight weeks. The lice quickly overrun the whole body, no part escaping their occupation excepting any portion from which the hair has been removed by clipping. It may here be noted that horses which are clipped early in the autumn rarely, if ever, become affected with Phthiriasis. Horses with long coats, however much they may be exposed to cold, are readily attacked. I have noted this especially during the past winter in the horses belonging to gipsies; they have suffered more than in any previous season that I remember.

This raises another point of interest, viz., the effect of wet seasons upon the extension of parasitic diseases due to ectozoa. Climatic influence in the development of vegetable epiphytes has already been noted, and it is well known that wet seasons favour the reproduction of some forms of entozoa at special points of their life history, and I have some reason to conclude, from observations during the past year, that this is equally true of some ectozoa, especially pediculi.

It is often a matter of difficulty to trace the source of infection. In many country districts there is a well-grounded supposition that barley straw is the source of evil. It is somewhat remarkable that Phthiriasis frequently follows the introduction of this kind of straw into the stabling and cattle yards; this I had noticed many times in my early connection with stock breeding, and it has been confirmed scores of times in professional life. I am unable to suggest any explanation, excepting that the ova of pediculi become in some extraordinary way stored in this special kind of straw. Of course, the common sources of extension which operate in all contagious diseases apply to those under notice, such as contact in fairs, markets, horse-boxes, etc., with affected animals, or the parasites or their ova may obtain an intermediary in the shape of harness, attendants, cats, and possibly vermin. The genus Goniocotes is obtained either by the stables being in direct contact with poultry houses, or the poultry being allowed to associate freely with the horses; the former, in my experience, is the most fruitful source of infection.

Removal of the cause in such cases generally has the desired effect, together with the application of some chemical dressing to the skins of the animals attacked.

Intense itching commences with the occupation and development of the parasites, and minute centres of depilation are noted, indiscriminately scattered all over the body and extremities; in no other disease does this peculiar loss of hair take place without any apparently important change in the skin, excepting occasionally in psoriasis. A case of the latter came under my notice in March, where the hair in a few weeks was entirely removed, producing large areas of baldness—in fact, the whole body was, more or less, denuded; there were no parasites present and no pruritus.

Where animals are attacked by Hæmatopinus equi, upon a close examination of the denuded parts small hæmorrhagic points may be noted in large numbers. After the louse has punctured the epidermis and sucked blood, a minute exudation takes place, but not sufficient, excepting in severe cases, to constitute vesication and eczema.

As in Scabies, severe injury is often done to the skin by the animal's vigorous efforts to allay the itching by friction; this quickly produces large areas of alopecia, and sometimes the epidermis is removed and the skin much damaged, even in a single night.

The variety Trichodectes produces less irritation when in small numbers, but as they increase the falling-off of the hair is very marked.

I was consulted respecting a horse a few days ago, which had lost almost all its hair on the neck, withers, and back; a patch of eczema existed on the withers, about three inches in diameter, and another in a semicircle around the tail; these patches were intensely itchy, and the owner suspected "Mange." Enormous numbers of trichodectes were present, deeply buried in the detritus of skin.

No difficulty exists in the destruction of pediculi where it is possible to have the hair closely clipped; but in the event of any objection to this operation, the process of destruction is often rendered tedious, as it is most difficult to work any dressing thoroughly into the long winter coat, and if this is not done the existing ova are not destroyed, although the mature lice may perish. After a few days fresh broods are hatched, and in a fortnight or three weeks the animal is covered by an entirely new family.

Clipping is sometimes difficult, owing to the restlessness of the animal, but it can in most cases be effected, after which the clippings should be destroyed at once by burning, and the animal washed thoroughly *all over* with an infusion of tobacco or staphisagriæ; this should be repeated again in a few days, in order to destroy any newly hatched ova. Sapo mollis, with an admixture of 10 per cent. of acid carbolic, forms a useful dressing, and is in addition thoroughly cleansing to the skin.

If the coat cannot be removed, it is safer to apply an oil dressing, *e.g.*, ol. picis, ol. tereb., and ol. lini., equal parts, or unguentum staphisagriæ; one application often effectually destroying both pediculi and ova.

Where animals have lost much flesh, and the skin is in a chronic state of inflammation from the secondary changes induced by rubbing and scratching, a course of mineral and vegetable tonics is advisable, in addition to an increase of albuminoid food.

The sanitary measures suggested in Ringworm and Scabies are equally useful in Phthiriasis.

The present occasion is peculiarly suitable for the discussion of our subject in relation to forensic medicine, as professionally we probably hold indefinite, if any, views as to the position of contagious skin diseases in the question of examination of horses as to soundness, and also their absence from the Contagious Diseases (Animals) Act.

So far as I have been able to follow veterinary jurisprudence, I know of only one action at law arising out of equine contagious skin diseases, viz., Scabies, recorded in the *Veterinarian* (vol. liv., p. 426, 1881).

The case arose from an alleged breach of warranty, and the plaintiff obtained a verdict for £18 with costs.

The "*scientific*" evidence in the case is a curiosity; a M.R.C.V.S. is reported as saying, "It (Mange) may originate from low condition;" "exposure might bring on the disease."

As there was no appeal from the verdict, we may probably presume that Scabies legally constitutes unsoundness.

Is this the opinion held by the majority of the profession? Is it the opinion of this Association?

This affection is not included in the C.D.(A.)A. Ovine Scabies is scheduled. Is it not equally reasonable that the equine form should also be under some legal control, in order that persons selling horses so affected may be responsible for losses arising therefrom?

If Scabies constitutes unsoundness, do Ringworm and Phthiriasis?

Ought either, both, or neither to be under legal control? Would such control facilitate their extermination?

If we are able to record some definite opinion upon the foregoing questions, I venture to think that the time spent upon the preparation and discussion of this paper will not have been altogether without results.

THE VIRUS OF RABIES.

PROFESSOR PEUCH, of the Toulouse Veterinary School, has been making some interesting and suggestive experiments with the virus of Rabies, the results of which are rather opposed to the views entertained with regard to the production or the presence of a special alkaloid in this viruliferous matter. He has ascertained, that if the liquid obtained by emulsifying the medulla oblongata of a rabid dog be filtered through porcelain, under a pressure of three atmospheres, that which passes through is destitute of potency, but that which remains on the filter communicates the disease.

A dog and three rabbits inoculated by intra-ocular injection with the non-filtered fluid, became rabid; the dog in twenty-two days, a rabbit on the eleventh day, another rabbit on the sixteenth day, and the third after twenty-seven days. On the other hand, a dog and three rabbits inoculated in the same way, but with the filtered fluid, experienced no ill effects.

This experiment clearly demonstrated that the rabaic virulence is not allied with the soluble substances found in the liquid, prepared and filtered as above.

It was deemed desirable to ascertain whether the animals inoculated with the filtered liquid had thereby acquired immunity against Rabies, whether, in fact, immunity results from a soluble protective matter. On May 3rd, forty-five days after the first experiment, the dog and rabbits were inoculated, intra-ocularly, with the medulla of a rabid guinea-pig, dissolved in distilled water. Four test guinea-pigs were inoculated at the same time and in the same manner. All these creatures became rabid, the first series as well as the last inoculated. On the 17th of May the dog was rabid; next day four guinea-pigs were attacked; on May 20th, a rabbit was affected; and on the 21st and 23rd of that month, the second and third rabbits were diseased.

From this it is concluded that the soluble matters contained in a filtered emulsion of virulent medulla do not possess rabific potency, and that virulence is the special attribute of the microbe of Rabies.

Peuch has been the first to demonstrate experimentally that animals inoculated with this filtered liquid are not protected against Rabies, though Pasteur had previously made experiments with regard to the filtration of rabific saliva, and Perroncito with that of rabific medulla oblongata.

ON THE DISEASES OF THE URINARY AND GENERATIVE ORGANS.*

BY A. E. MACGILLIVRAY, M.R.C.V.S., BANFF, N.B.

THE consideration of this subject was suggested by myself for various reasons; chief among which I may note the fact that I have given every attention to it for the last twenty-four years, during which period I have not only experimented and made myself practically conversant with a great many of the numerous diseases, surgical and otherwise, embraced within its limits, but have also often brought my ideas on the matter, whether original or acquired, under the notice of the profession in the pages of our veterinary periodicals.

Another reason for my selection of this topic for discussion is that, in my opinion, it has hitherto received but scant attention at the hands of the veterinary profession; the truth of this will be best seen by referring to the extreme prominence given to the study of the same subject by the *literati* of the medical profession, and then glancing at our own meagre literature on

* A paper prepared for discussion at the meeting of the National Veterinary Association in July, 1889.

the diseases of the genito-urinary system. It were needless to begin enumerating the valuable, extensive and exhaustive treatises which have been written by the medical profession on this interesting and important part of their duties, for their name is legion; but turning to our own profession we find little of any consequence except in the writings of Fleming, Williams, and Steel. True, we find now and again in our veterinary periodicals a communication or a paper with some original or practically useful suggestion or fact in reference to this class of diseases, but of a thoroughly exhaustive work on the subject veterinary literature is *minus*.

As a matter of course it is impossible, even if I were capable, for me to give even a faint outline of what would render the consideration of our subject-matter even partially complete, my limits forbid any such attempt. I will therefore cast aside all scientific classification of the diseases to be embraced in my paper, as well as all routine details in their discussion, and confine myself almost entirely to what I have either done or seen in my own practice. This I consider the safer and wiser course to adopt in bringing forward what is intended to be fully as much a popular as a scientific paper.

With these prefatory remarks I will now proceed to discuss the diseases which I have found affecting the generative organs in my patients. *Vaginitis* and *Balanitis* are analogous diseases in the male and female, consisting of inflammation to a greater or less extent of the mucous membrane of the more external organs of generation, as their names imply, and attended by a discharge varying in quantity and nature. In my own opinion and experience this inflammation may be either specific or simple, a fact which is not generally known or accredited as regards the lower animals, but which nevertheless is strictly true.

In *simple* Vaginitis and Balanitis we have first an increase in the depth of the colour of the mucous membrane of the vagina, penis, and prepuce; then a slight glairy (increased natural mucous) discharge with pain; and finally a discharge of laudable pus of yellow colour and creamy consistence. The disease, although mild, is very painful, and may arise from a variety of causes which I need not specify. It is comparatively common in all the lower animals, and is easily removed by very weak solutions of zinc sulphate, Goulard's extract, or an application of zinc ointment and vaseline.

Very different in its course and determination is what I must call the *specific* form of Balanitis and Vaginitis. No doubt the adoption of the attribute "specific" in this connection will be questioned, but when we find the diseased products from one patient producing the disease anew in another, we are forced to the conclusion that we have something specific to deal with; in fact we must fall back upon the old story of "like producing like"—which is certainly specific enough for our argument.

I have somewhere seen another designation for this contagious Vaginitis and Balanitis, namely, *Vaginitis impura*, etc., which is a very good definition of the disease in one respect, for it is an exceedingly impure and dirty affection; but when its products, by contact, produce similar lesions in similar organs of other subjects, we must argue that there is something quite evidently specific in its nature.

Balanitis and Vaginitis impura are then, we will say, a specific inflammation of the mucous membrane of the organs referred to, ushered in by an increase in the colour of the mucous membranes affected, which become a *brick* red instead of a deep violet red as in the simple form; in the first stage there is also often an eruption of small pustules or vesicles, which, however, soon degenerate into ulcerations of greater or less extent. These ulcerations are often of considerable size superficially, have yellow ragged edges, and ooze out thin watery pus, sometimes streaked with blood. When the disease runs on to this extent it is accompanied by considerable fever and great

pain and uneasiness, more especially during micturition, when the poor animal will sometimes become quite frantic, lying down and getting up as if suffering from colic.

This impure and contagious affection of the vagina and glans penis and prepuce is sometimes followed by rather serious consequences, which render its study all the more necessary and interesting to the veterinary profession; I refer to the fact that, when extensive ulceration exists and is not promptly and properly treated, the inflamed and ulcerated glans penis and inner prepuce *grow together quite firmly*, and so prevent the necessary extension or erection of the penis during copulation. I know of several very valuable shorthorn and black polled bulls that were rendered utterly useless by this untoward occurrence; and I have treated a good few that would have shared the same fate if they had not been very energetically handled. In like manner, and under similar conditions, the walls of the diseased vagina will sometimes get firmly attached for three or four inches or more at the *ostium vaginæ*, and thus produce complete occlusion of that organ. Either of these occurrences, but especially the former, is rather a serious matter pecuniarily and otherwise when it happens in a highly bred and pedigreed animal. In the horse and dog I have met with *paraphymosis* during an attack of this impure Balanitis; the glans penis having become so swelled that, with prepuce or sheath in a similar state, its retraction within the latter was utterly impossible. When much effusion was present in such cases I never hesitated about freely using the knife or lance, and following up with continued warm bathing. In dogs this condition is extremely painful, and calls for immediate relief.

The origin of this contagious form of Balanitis and Vaginitis is generally to be looked for in mares, cows, or bitches with an abnormal *uterine discharge*, such as patients affected with *Leucorrhœa*; it must be observed, however, that all leucorrhœal discharges have not this pernicious effect, and to say exactly when, how, and why this abnormal discharge becomes contagious is is more than I can do; of one thing I am certain, however, namely that in dozens of cases I have found it so.

The treatment consists in the injection of a pretty smart solution of copper sulphate with a slight dash of carbolic acid, but if much pain be present the latter may safely be omitted. This may have to be repeated.

In cases where adhesion of the inflamed and ulcerated mucous membranes is threatened, I apply very freely carbolised zinc ointment, and in severely obstinate cases add a little mercury nitrate ointment, which I find, in combination as above, very efficacious. This ointment is best applied smeared on to a soft moist sponge, which latter can be very conveniently introduced to the inflamed, ulcerated, or partially constricted passages, fastened to the end of a piece of cane. In the case of bulls this sponging is often rather a difficult matter, and to accomplish it properly I have many a time thrown down and secured the patient with ropes before attempting to do so; in such a position one gets the operation thoroughly done.

Advancing a step we find *urethritis* presenting itself for our consideration. In the medical profession this is a most important disease, but in veterinary practice, in so far as I am concerned, it occupies only a secondary position; I have, however, met with it in horses, cattle, and dogs. It may result from accident, or from the irritation produced during the passage of abnormal discharges from the bladder or kidneys; I have met with it in all three forms; and, curious to relate, I have been called on to treat several cases where complete occlusion of the urethra occurred in young cattle as a sequel to Urethritis. As a matter of course the passage of a catheter in such patients was simply impracticable and never attempted. In three of these cases the walls of the urethra, at the perineal portion of the penis, seemed either to

have given way or become immensely distended, in consequence of which a large fluctuating swelling appeared at the perineum, which I opened, and in two cases, improvised and introduced a metallic tube into the opening, and through this tube the urine was ever afterwards ejected! One of these patients continued to thrive and do well for eighteen months until it was fit for the butcher, and always passed its urine through the tube during the whole of that period, lifting the tail and roaching the back like a heifer! The other died in about a week after the introduction of the tube.

The tube was fully half an inch in length, and a quarter of an inch in diameter, and had about half an inch turned back at both ends at right angles to its body; one end was introduced into the wound and kept there by sutures in the common integument. The wound healed in a short time, enclosing the projecting part at the inner end of the tube, and thus rendered the escape of the latter impossible. The owner considered this case a complete wonder, and made quite a show of the "ox which was turned into a heifer."

Returning to our subject, however, we find the *treatment* of Urethritis in our patients rather a difficult affair, and almost entirely depending on the cause. If resulting from Prostatitis or Cystitis, or accompanying Vaginitis or Balanitis, the removal of either of these diseases must be a primary step, which being accomplished, the Urethritis, if merely sympathetic or the result of either of these affections, will also most likely disappear. Otherwise caustic injections of various sorts and powers will be necessary, but as I have said are rather difficult of application. I have used copper, zinc, and silver lotions as I thought most applicable, and always very mild, as I have ever had a dislike to the use of strong lotions in these cases; in mares and cows I have introduced zinc ointment into the urethra with my finger; and in one case, which I will hereafter refer to, a solution of carbolic acid in glycerine.

Prostatitis, except in canine practice, is not at all a daily occurrence in our profession, for which we cannot be too grateful, as in human practice it is comparatively common and generally very intractable to treatment. I have very little experience of this affection, except in dogs, having only seen three cases of it. It is, in the lower animals, a very obscure disease and scarcely ever dreamt of; but, if we meet with a case of urethral discharge of unknown origin and attended with difficult urination, we may suspect and look for disease of prostate which very generally ends in suppuration of the gland—the products of which escape either into the urethra or bladder.

In dogs prostatic enlargement, sometimes very great, is sure to cause difficult or even entire suppression of urination, and consequently distension and ultimate rupture of the bladder. This state of matters is very little amenable to any sort of treatment, even the passage of the catheter being in many cases almost impossible, and unless very cautiously gone about only aggravates the disease. In the dog we may feel the enlarged gland by introducing the finger into the rectum, but no surgical treatment can safely be adopted per rectum in the dog or, for that matter, almost any other animal, as although the enlarged gland be quite surcharged with pus, it is contained in numerous small individual (or isolated so to speak) cysts, and quite unfit for evacuation per knife.

Several years ago I had a most remarkable case in a two-year-old entire pony colt; when called to attend this animal I found the penis the seat of what appeared to be a great many abscesses, which were discharging matter freely; on endeavouring to thoroughly clean the organ with soap, water, and carbolic acid—the latter partly to keep down the frightful smell—I discovered that the anterior part of penis for fully three inches was entirely destroyed, being like a piece of sponge and literally riddled with pipes of pus. I amputated at once with no difficulty; I then cleaned as well as I could all

the remainder of penis and prepuce, and freely applied a strong caustic lotion; but all was of no avail, the poor creature dying two days afterwards. *Post-mortem* examination showed an immensely enlarged prostate gland, with pus oozing from it in every direction; bladder burst, and a large quantity of muddy fluid all through abdominal cavity—consisting of pus, urine, etc. In this case I have no doubt the disease began in the prostate and spread to the contiguous tissue of glans penis, etc. As to the origin of the prostatic affection or when it commenced, no information was to be got, as my client purchased it late at night the day before I was consulted, from an old gipsy woman, and never noticed till morning the serious state of what he called "its privates"! Verily, the old woman was quite a match for my client!

I don't think I need take up time referring to any sort of treatment for Prostatitis in our patients; cases amenable to treatment being only remarkable by their paucity—may be treated according to their merits—so to speak.

Fleshy growths and other *tumours* on the penis and in the vagina next come under observation; these are of various sorts and sizes; in the male often producing paraphymosis, and in the female completely blocking up the vagina. These tumours are very seldom malignant, in proof of which I have only met with two such during the last twenty-four years. When malignant their reproduction is very rapid; I remember excising one with the hot iron from the vagina of a mare, and in 48 hours it was bigger than ever, so she was sent to the knacker.

Benignant tumours of whatever description or size, and whether on penis or in vagina, I find most effectually removed by the actual cautery. I have removed by ligature and with the knife, and applied caustics to raw surface left, but I have almost always found the tumour reproduced, which never happens after the hot iron. Warts and other tumours, sometimes as large as one's hand, are often found on the glans penis of bulls, producing persistent paraphymosis; in removing these it is necessary to get an assistant (with a silk handkerchief) to firmly grasp the penis, the tumour is then removed with a sharp scissors and the raw spot left immediately cauterised with the hot iron. I have never seen these tumours reappear after such treatment.

If the tumour is entirely within the vaginal canal, never appearing outside except during or immediately after parturition, it must be pulled outside and a strong cord run through it and formed into a loop; putting traction on this loop the tumour is pulled wholly outside, and a sharp-edged hot iron used in gradually cutting through its base, which is often a mere finger-thick pedicle. I have never been bothered with hæmorrhage in these vaginal cases; but in performing on the penis the hæmorrhage is at times very great, and is best combated by injections into sheath of cold water and tincture of iron muriate.

Cysts of various dimensions are rather common in the vagina of the cow, but seldom in the mare, and are always a source of aggravation to the owner of the patient. I am entirely at a loss to account for their occurrence; they are generally composed of a very thin partially transparent capsule containing a light-coloured rather dense serum, which is sometimes not quite clear, but never has more than the slightest tinge of colour. The other day I met with quite a large cyst of this sort in a newly calved cow; this cyst was never seen until the cow began to calve, when the owner discovered what he took to be part of the "cow's bed" coming *before* the calf; being a large and very roomy cow, however, delivery was shortly accomplished in spite of this abnormality; but as soon as the cow lay down the alarmed owner noticed the cyst appearing beyond and outside the vulva, and, dreading prolapsus uteri, had the cow banked up behind. I was consulted the day after delivery, and on examination discovered a large and most beautiful cyst, with a very fine network of blood-vessels all over its walls, very much resembling

the outside of that important contiguous cyst—the bladder. Introducing my hand I distended the vulva and pressed part of the cyst well into view, and making a large slit with my knife in its walls, at once evacuated the whole contents. I have never seen these cysts reproduced. I should be glad if any of my readers could account for their appearance. These cysts vary much in their attachments, some having a very broad base and others hanging on by a mere pedicle; whether the one or the other, however, simple evacuation rids us of this abnormality.

The *os* and *cervix uteri* are subject to a number of diseased conditions; these may be either sympathetic or positively restricted to the locality. Simple catarrh of these parts is not a common event in veterinary practice, and need scarcely be noted; if met with, however, it may receive the same treatment as has been recommended for the like affection of the vagina. The cervix uteri is often the seat of a kind of Leucorrhœa, but as the later disease will be fully considered by itself, we need not here do more than mention it.

We have *occlusion* of the os and cervix uteri, both congenital and accidental, that is either at birth or resulting from disease or accident. The congenital form of this abnormality often gives rise to a most peculiar train of symptoms. The heifer (I have never seen it but once in a filly), when about one year old or a little more, begins to get unthrifty in appearance, to increase in abdominal bulk as if pregnant, although very likely never served; the latter symptom goes on increasing until one day severe tenesmus sets in. Owner thinks heifer is to calve, and wonders when she could have been served, and so on. A manual exploration and examination per vaginam generally reveals the fact of an occluded *os* and *cervix uteri* of variable extent. Finding this, I then explore per rectum to discover to what extent the uterus is distended; as a rule, if the heifer has never been served, the fluid contents of uterus in these cases is something enormous, so much so that the rectal exploration would lead one to suppose that there was nothing but the distended uterus within reach. In such instances I never hesitate about evacuating the abnormal uterine contents by the introduction of a trocar and cannula through the os and cervix uteri, that is to say if it is impossible to force through the constriction with one's finger or fingers. After this evacuation I wash out the uterus with a mild solution of carbolic acid, which may have to be repeated.

The other form of *atresia* of os and cervix uteri is quite a different affair, being generally only observed at parturition. It is known as stricture or scirrhus of os and cervix, and is most commonly found in either a hard cartilaginous or a soft fleshy state of these parts, but in either form quite unyielding. In so far as my experience goes the only remedy is the knife, the operation being known as vaginal hysterotomy; I have performed this operation very often, and have always been successful in all the cases where the abnormality was hard and cartilaginous, but where soft and fleshy my success has generally been confined to saving the offspring. The reason of this is apparently that, where the constriction is soft and fleshy, there is *active disease* of some sort present, which seems to be repugnant to any active or heroic interference, the operation in such cases being almost always followed by blood-poisoning and death.

We have both *cancer* and *tubercle* affecting the os and cervix uteri, but my space forbids me to do more than refer to them.

I therefore pass on to notice a sort of *Paralysis* of these parts, which I have observed after parturition; in these cases the os and the cervix don't assume their normal position but remain relaxed and open; and, if examined with a very powerful speculum, it will usually be found that the parts protrude or hang into the cavity of the vagina and appear quite flabby and inert. In so far as I have observed, no signs of local injury have been met with in these

paralysed parts, and no particular accompanying tenesmus or straining, but simply a great relaxation of the os and cervix and their extreme prolongation into the vagina; in fact, if patient be recumbent, the paralysed parts sometimes appear at the vulva. In one interesting case of this sort only the one side, or one half laterally, of os and cervix was paralysed, and appearing outside during recumbency greatly alarmed the owner. I could never fully satisfy myself as to the cause of this peculiar paralysis, and shall be glad if any one can suggest a probable theory as to its origin. The treatment adopted was nerve tonics internally, and carbolised glycerine or carbolised olive oil locally.

Passing beyond the os and cervix uteri we approach a most important disease, affecting, in general, the *uterus*, but also perhaps at times the cervix uteri; I refer to *Leucorrhœa*, *fluor albus*, or *the whites*. In my opinion this disease plays a far more serious part in reference to the breeding of cattle and horses than is commonly supposed; during the last twenty-four years I have known many a good and valuable animal rendered utterly useless, simply through neglecting an attack of Leucorrhœa, and on the other hand I have scored a good few remarkable cures of such cases in mares, where the disease had become disgustingly and dangerously predominant.

It is now a good many years since I wrote an article on *Leucorrhœa* for the *Veterinarian*, in which I entered pretty minutely into the origin, nature, symptoms, and treatment of this affection, but since then I have considerably simplified my ideas on the subject. In that paper I speak of three forms of Leucorrhœa, namely, vaginal, cervical, and uterine; but at present I am inclined to view the *uterus* as the only and true seat of the disease; the cervical and vaginal affections, if at all present, being only the result of the irritating passage through these parts of the diseased accumulations escaping from the uterus. Leucorrhœa is then, we will say, primarily a uterine disease, and is characterised by a more or less profuse but inconstant discharge from the organ of a muco-purulent, a purulent, or sanio-purulent nature, for I have never in our patients seen the purely mucous but abnormal discharge mentioned by medical writers; neither do I believe that the occasionally extremely white colour of the discharge is owing to the action of the acrid vaginal secretions on the abnormal mucous discharge from the uterus, as I have over and over again withdrawn this *light-coloured fluid* from the uterus direct with an elastic tube, thus thoroughly preventing its contact with the vaginal secretions. The amount and character of this discharge or "flow" will depend on the extent and nature of the uterine affection; and the latter will be ruled by the cause or causes, which may be both proximate and remote. For instance, a cow calves all right, but does not readily part with the *decidua*, which may be kept till the eighth or ninth day after parturition; this abnormal retention of the placenta causes a great deal of irritation and immensely increases the natural lochial discharge, which latter, if the cow have a tubercular or rheumatic diathesis, will likely degenerate into a confirmed leucorrhœal "flow;" and, if not promptly checked, the mucous coat of the uterus will become irreparably injured. Here the proximate cause is the retention of the decidual membranes or part thereof; the remote cause being the tubercular diathesis; for a great many cases of retention of decidua are not followed by Leucorrhœa, simply because the patients are thoroughly sound in every way.

The limits of this paper, however, compel me to refer to my previous communication (vide *Veterinarian* for November, 1872), for particulars as to the nature and proximate and remote causes of Leucorrhœa; so I will now pass on to notice the pernicious effects of this disease in extensive breeding establishments, and in doing so I will stick closely to facts which have occurred in my own practice or in consultation with some of my *confrères*.

I have before referred to a special form of Balanitis and Vaginitis of a contagious nature; now, I have no hesitation in asserting that the majority of such cases owe their origin to the contact of a bull or stallion with a cow or mare, as the case may be, while the latter have been affected with Leucorrhœa. Dozens of cases of this sort occur and are traced to their true origin; I will give one as an example. At a farm in this district where short-horns are bred several cows became very bad with impure Vaginitis; I was consulted and, on examining the cows, I volunteered the opinion that the bull was to blame, and that very likely he had been affected by some leucorrhœal subject. When the cattleman appeared, to take the bull out for inspection, he told us that the latter was unable to serve a cow that morning as he could not "draw" properly! I found the poor bull very bad with impure Balanitis and quite unable to erect his penis—adhesion having evidently already commenced between that organ and the prepuce, so that he must have been badly for some time. Being rather a refractory animal it was impossible to satisfactorily treat this bull without casting him, which I did no less than three times, and used every means in my power to render him again fit for service; but all was of no use, the poor brute could never again "draw" to accomplish the purpose for which he was kept. In this case the adhesions between the glans penis and prepuce were too firm for removal by even the most energetic treatment, having evidently been too long neglected. On investigation it was discovered that the bull had contracted the disease while serving a cow with a bad and long-standing discharge, from a neighbouring farm, which cow with two of her offspring ultimately succumbed to Tuberculosis!

This bull was a very valuable animal, having gained several prizes, and proved himself a good stock getter. I may here mention that I afterwards treated this disease-spreading cow on two different occasions (a year between) for uterine Leucorrhœa; so that cows with a tubercular diathesis may be set down as very readily falling victims to this affection after calving, abortion, or missing of service, or more properly speaking checked fecundation.

I remember another very superior bull, worth some 500 guineas, being rendered useless from the same cause, but I could never trace the origin of the affection in his case, as he was badly before coming into my client's hands. But it is needless to enumerate these untoward instances, aggravating alike to owner and veterinary attendant.

It is a problem worth considerable close investigation whether or not these cows with a leucorrhœal discharge are not often the cause of those mysterious outbreaks of abortion in valuable and well housed, well fed, and well attended herds; the ante-partum and post-partum discharges in these cases look extremely provocative of fostering this idea; and I have myself a good deal of practical experience of the benefits to be derived from profuse antiseptic injections, both in cows and bulls, as a preventive of a continuance of these abortions. The abortion question is serious enough to excuse my giving the following particulars of the events preceding two years of wholesale abortion on an extensive and well-stocked farm.

A very fine polled bull contracted impure Balanitis from a neighbouring farmer's cow *with Leucorrhœa*, and in course of time infected several cows at home, all of which were severely and successfully treated by me for impure Vaginitis. This bull was a peculiar case, in so far as, after recovering from the local affection, he broke out in large blotches all over his body; there were dozens of these blotches on him at one time, all oozing out thin acrid matter; he got over it all, however. But mark the unfortunate results in this herd, which had previously been a most successful breeding one, *nearly all the cows and heifers aborted when from five to seven months pregnant!*

Three or four of the seven months' calves lived and did well, and almost all the aborted fœtuses were alive when brought forth. The abortions continued during a second season, not only among home-bred cows and heifers, but also among several bought-in females.

Now, we can scarcely help seeing some connection between the preceding impure disease of part of the generative organs and this untoward outbreak of abortion; the latter occurrence is commonly supposed to be caused by the presence of some irritating or abnormal material or force *in utero*, but I have never been able to satisfactorily account to myself what that abnormal material or force consisted of or was caused by. The theories as to the origin of abortion are numerous and conflicting and so much discussed that I don't intend here specially referring to them; but considering the appearance, nature, and character of ante- and post-partum discharges in most abortion cases, I think it is quite reasonable to argue that the connection between the prior impure and contagious disease of the male and female generative organs and the subsequent abortion and its sequelæ is but too evident. We are all practically conversant with the nasty post-partum lochia, often profuse and persistent, in the generality of abortion cases, and we know quite well what happens if a bull be allowed access to these aborted cows, with impure discharges, and then to healthy cows; what? Usually impure Vaginitis, followed by abortion, and so on *ad infinitum*.

A client of mine, who suffered serious loss by abortion among his cows, once told me that he thought he could stop the abortion by washing out the uterus of every cow about his place with a weak solution of carbolic acid, and at same time thoroughly lime-washing his cow byres: I willingly coincided with my client's opinion, but said the uterine ablutions would be rather difficult to successfully accomplish. I have in dozens of cases used a very mild solution of copper sulphate, with or without the addition of a little carbolic acid, for the same purpose as that proposed by my client, and I can confidently recommend its adoption in such circumstances.

The *treatment* of Leucorrhœa, if early adopted and persistently pushed, is usually a very simple matter and, in so far as I am concerned, always consists of washing out the uterus with a mild solution of copper sulphate and carbolic acid. As a matter of course if the uterus be surcharged with diseased fluid material, the latter must be evacuated before injecting the above solution, and in some cases (in mares) the quantity evacuated will be something enormous. In very obstinate cases I sometimes administer twice a day, either in ball or powder, dram doses of copper sulphate. In mares I have never seen the disease recur; but in cows with a tubercular diathesis this affection will occur again and again under the slightest provocation, and in such subjects it is the most dangerous.

The *uterus* is liable to a variety of other diseases, such as *endo-* and *peri-metritis*; *hydrops uteri*, which is often confined to the decidual membranes or placenta; *tumours*, and different phases of *tubercle;* but I will not here discuss these subjects.

Disease of the *Ovaries* in our patients is rare and very difficult of diagnosis; I have only observed ovarian *dropsy* (cystic and otherwise), and deposits of tubercular matter, the latter causing an alarming and almost continual œstration which is known as *Nymphomania*.

From the ovaries I will pass on to the *Testicles*, which are liable to a variety of diseases very common and of great importance in human practice, but the reverse in our profession, our patients not being so liable to contract the "ills" peculiar to these parts: *swelled testicles* is a sort of generic term, embracing a good many diseases such as *orchitis*, *sarcocele* of more than one description, *hydrocele*, *hæmatocele*, *epididymitis*, etc.; all these I have met in either horse, bull, or dog.

I draw a line between Orchitis and Epididymitis, although some writers use these terms indiscriminately; the former I restrict to inflammation of the testicle, *per se*, leaving epididymitis to stand on its own legs, so to speak. Orchitis in our patients generally results from injuries or tubercle, more commonly the former. Pure inflammation of the testicle, without effusion into tunica vaginalis, is a very painful affair, more especially if caused by injuries; swelling, heat, extreme tenderness, fever, and inappetence, are the symptoms usually observed in our patients during an attack of simple Orchitis, and is most successfully combated either with anodynes or iodine liniment, or first the one and then the other. Under such treatment resolution may, and often does, take place; otherwise suppuration of the body of the testicle may occur and require free evacuation and very likely subsequent removal; I have seen a good few such cases in young calves, where, after recovery, I have almost invariably removed the testicle or testicles. In canine Orchitis I have observed effusion into tunica vaginalis, not Hydrocele, and in such instances the inflammation has generally been subacute and a sort of chronic. Apply a mild preparation of iodine, and administer repeated doses of potassium iodide.

Tubercular Orchitis is far from uncommon, and may be set down as a very serious matter, being incurable and unquestionably the means of propagating or spreading Tubercle. I have met with this form of swelled testicle in cattle and pigs, and in the former the tubercular testicle sometimes becomes enormously enlarged; I have removed one as heavy as 8 lbs.! As a rule, however, it is rather dangerous practice removing tubercular testicles; as, if the disease exist any considerable distance beyond the testicle and up the cord, death is almost certain to occur; I speak from dire experience. I remember a case of a boar with tubercle-laden testicles, whose offspring were very prone to fall away under the various forms of "ulcers," as the owners termed it! This boar was castrated, but he survived the operation and was subsequently fed.

Epididymitis, which I have purposely kept by itself, consists of inflammation of that important appendage (or efferent vessel) to the testicle called the epididymis, and is generally the result of injury, tubercle, or through sympathy with or actual extension of Orchitis. The most interesting thing about this affection is that it is often the cause of the loss of the procreative powers; either during the progress of the inflammatory action, or as a result or effect thereof, the tubes composing the epididymis (globus major and minor) become permanently blocked, thus thoroughly preventing the passage of the semen from the testicle to the vesiculæ seminalis and the urethra. This is a most important consideration, and is brought forward as the result of practical experience during post-mortems. This occlusion of the epididymis is sometimes incomplete, a very limited supply of semen finding its way to its natural receptacle and channel for ejection; but whether partial or complete it very much depreciates the value of the animal, and in the one case renders him useless as a stud animal.

Having settled the presence of Epididymitis, the treatment will be analogous to that for Orchitis.

Hydrocele and *Hæmatocele* of the testicles (so to speak) are apt to be confounded in our patients, but can scarcely be so in human practice; the swelling in the hydrocele, however, is softer and more fluctuating and attended with less pain than the rather more circumscribed swelling in hæmatocele, which in a very short time will lose its fluctuating feeling, and, becoming firmer, will pit on pressure.

Hydrocele is an abnormal collection of clear watery fluid in the cavity or sac formed by the tunica vaginalis testis; while Hæmatocele is an engorgement of the same sac or cavity with blood; hæmatocele may be and very

generally is primarily the result of an injury; but Hydrocele is commonly dependent on some previous disease of the testicle or its membranes or tunics.

In Hydrocele of the lower animals the only advisable treatment is to evacuate the fluid and then inject the cavity with iodine tincture; destruction of the secreting membrane, adhesion, and obliteration of the cavity follow, thus preventing any return of the disease. In Hæmatocele at an early stage evacuation is inadmissible, as the internal primary and causative hæmorrhage will very likely recommence; it is best, therefore, to apply evaporating lotions for some time, and if absorption do not follow, then apply iodine in some suitable form. If the blood be not ultimately reabsorbed suppuration will almost certainly occur, in which case, as in Hydrocele, the cavity will cease to exist. I remember an interesting case of hæmatocele testis in a seven-year-old stallion, the result of a kick from a mare. I recommended cooling and, as much pain existed, anodyne applications, and in a few days the abnormal collection of blood in the tunica vaginalis was entirely reabsorbed, and my patient again on his rounds. Another case in in a dog ended in suppuration, and subsequent atrophy of the testicle.

Sarcocele is not a common occurrence in veterinary practice, but has been met with in three forms, namely, a fibro-vascular enlargement of testis of either a malignant or benignant description, and the tubercular form; the latter being not at all infrequent. But whether malignant, benignant, or tubercular, the only treatment consists in excision, and the sooner the better. Before operating care must be taken not to confound either of the two previous affections with Sarcocele. I saw a case lately in a pure short-horned bull where both testicles were affected with fibro-vascular Sarcocele; an empiric had been called in and he had *lanced* both sides of scrotum, expecting to find *matter*, but no, only *proud flesh*, as he called it, jutted out at the two incisions! As the bull was fat I advised slaughter; for, although of very high pedigree, he had never had any offspring, the Sarcocele having evidently been begun in both testicles before his arrival as a yearling, at the farm where I saw him, he being then two years old.

It would be a very interesting study to follow out the various causes of sterility or non-productiveness in the various lower animals, more especially in males; it is certain that the Sarcocele was the cause in this highly bred two-year-old bull. (*To be continued.*)

THIOCAMF—A NEW DISINFECTANT MATERIAL.

In "Notes on Science in Practice," Professor Emerson Reynolds, M.D., F.R.S., gave an account of this new agent at the last meeting of the Royal Dublin Society on June 22nd. He said: "Since writing the chapter on Disinfection in the *Manual of Public Health for Ireland* I have sought some simpler means than is there recommended for disinfection of rooms, so that any intelligent person could attain the end in view without risk of fire, without the use of corrosive materials, or of large quantities of any agents, and without involving the presence of the operator in the room, or the employment of special apparatus. This search has been successful, and I have now the pleasure of bringing under your notice the singular liquid which fulfils the conditions I have just specified, and to which the name of 'thiocamf' has been given. The basis of this novel disinfectant is a very curious liquid which results when sulphur dioxide gas is brought in contact with camphor. At ordinary temperatures the gas alone requires a pressure of more than two atmospheres to liquefy it; but camphor, owing to chemical attraction, can liquefy the sulphur dioxide gas without any pressure whatever. In this

liquid are dissolved several powerful substances, but I am not free to enter into further particulars, as the patent specification for thiocamf has not yet been published. A quantity of the liquid has been preserved in my laboratory for nearly two years in a corked bottle, and has not undergone sensible alteration during that time.

"Thiocamf possesses almost unique properties, for while it can be preserved without pressure in ordinary bottles at mean temperature, mere exposure of the liquid in a thin layer to the air determines the steady evolution of relatively enormous volumes of sulphur dioxide gas from it, charged with the vapours of other powerful disinfectants. These gases and vapours diffuse through the whole of the air of a well-closed room, and therefore must reach everything in the room if given reasonable time. The question then arises whether the sulphur dioxide gas can destroy the bacteria, particularly infective forms, when it reaches them. The evidence on this point has hitherto been of a rather loose kind, though the results lead to the conclusion that sulphur dioxide gas is a powerful bactericide. Happily, the truth of this conclusion has now been placed beyond doubt by a critical investigation of the subject aided by modern methods of bacteriological study. This examination has been carried out in Paris by MM. Dubief and Bruhl, under the direction of Dr. Dujardin-Beaumetz, and the results have been recently communicated to the Academy of Sciences. Starting with air rich in germs, and combining Miguel's method of numbering the bacteria with alkaline culture, Dubief and Bruhl found that the germs were always reduced in number after the action of dilute sulphur dioxide gas; therefore the latter destroyed the vitality of the germs. It was further found that the number destroyed increased with the duration of the action of the gas, and that this destructive action was accelerated when the humidity of the air was increased. In all the experiments with the rather dilute sulphur dioxide gas used the latter proved particularly fatal to micrococci and allied bacteria, whether diffused through the air of a chamber or attached to its walls. As these are organisms of the class which true disinfection seeks to destroy, this testimony to the value of sulphur dioxide is of exceptional importance. Lastly, these investigations have shown that sulphur dioxide gas is a true bactericide even in a dry state, though longer time is then required for the production of its full effect.

"The bearing of these results on the value of thiocamf is obvious, for if sulphur dioxide gas alone be so powerful a bactericide, the mixture of sulphur dioxide with vapours of other disinfectants of acknowledged value is a combination of exceptional power. Moreover, there is no material that I know of except thiocamf which can give off so large a relative volume of sulphur dioxide gas (the contents of a small six-ounce bottle can afford over 20,000 cubic centimêtres) without any special treatment save exposure in a very thin layer on an old tray or dish to the air of a room to be disinfected. Further, one ounce of thiocamf shaken up with a quart of water forms a powerful disinfectant for ordinary purposes, such as sprinkling over various matters, purifying drains, etc.; while a still more dilute solution (one ounce to a gallon) can be used for soaking clothes which have been in contact with infected persons. The residue of thiocamf has a pleasant aromatic odour.

"This concentrated disinfectant can now be produced at a cheap rate, and an apparatus has been erected for its manufacture which can afford several hundredweight of thiocamf per week."

SECOND CONGRESS FOR THE STUDY OF TUBERCULOSIS.

We are asked to announce that the subjects to be discussed at this Congress, which is to be held at Paris towards the end of July, 1890, under the Presidency of Professor Villemin, are as follows :—

1. The identity of Tuberculosis in mankind and bovines, poultry, and other creatures.
2. The bacteridian and morbid accompaniments of Tuberculosis.
3. The hospitalisation of tuberculous patients.
4. The innocuous agents capable of destroying Koch's bacillus, from a prophylactic and therapeutic point of view with regard to human and animal Tuberculosis.

THE FITZWYGRAM PRIZE COMPETITION.

The competition for these prizes took place in London and Edinburgh on June 12th and 13th for the written portion, and at Aldershot on July 30th for the practical portion. Ten competitors presented themselves, and the result was that Mr. A. E. Mettam (Dick Veterinary College) was awarded the 1st prize (£50) ; J. B. Robertson (New Veterinary College) the 2nd prize (£30) ; and E. E. Martin (Royal Veterinary College) the 3rd prize (£20). The examiners were R. Poyser, F.R.C.V.S , Army Veterinary Department, and A. Robinson, F.R.C.V.S., Greenock.

Proceedings of Veterinary Medical Societies, &c.

YORKSHIRE VETERINARY MEDICAL SOCIETY.

The summer quarterly meeting of this Society was held on July 19th, at the Queen's Hotel, Leeds, the President, Mr. W. Lodge (Dewsbury) in the chair ; and there were also present Messrs. Jos. Carter (Bradford), G. Carter (Keighley), A. W. Briggs (Halifax), A. W. Mason, G. Bowman, and W. F. Greenhalgh, Hon. Sec. (Leeds), Mr. J. Scriven, Hon. Treasurer (Tadcaster), H. Snarry and G. T. Pickering (York), G. Clarkson (Aberford), S. Chambers (Kirkheaton), members of the Society ; and Dr. Watts (Medical Officer of Health, Dewsbury), Mr. T. Exley, M.R.C.V.S., Mr. E. Anderton, and Mr. P. F. Falshaw, visitors.

Letters of apology for non-attendance were read from Professor Axe, Messrs. Bale (Otley), Axe (Doncaster), Longhurst (Hull), Kidd (Hungerford), Deighton (Riccal), Danby (Bainton), Hardy (York), Greaves and Faulkner (Manchester), Scott (Harrogate), Frear (Uppingham), and A. Leather (Liverpool).

Mr. G. Carter proposed Mr. Longhurst (Hull) as a member of the Society. Seconded by Mr. Mason, and carried.

Mr. Scriven proposed Mr. Gavin Scott (Scarborough) as a member Seconded by Mr. Mason, and carried.

Mr. Greenhalgh nominated Mr. T. Exley (Leeds) as a member of the Society

Empirics as Meat Inspectors.

At the last meeting of the Society a committee was appointed to consider the question of the appointment of empirics as meat inspectors, etc., and the recommendation of the committee was submitted in the following form for adoption :—

"At a meeting of the Yorkshire Veterinary Medical Association, held in Leeds on July 18th, the question of official meat inspection and of the over-

sight of cow-sheds and dairies was introduced and discussed. It was decided then to point out to the various local sanitary authorities throughout Yorkshire the importance of these matters, and the necessity for substituting duly qualified veterinary surgeons for policemen and empirics generally as meat inspectors, and at the same time to recommend to the various sanitary authorities the advantages which must accrue from such a reform of the existing arrangements. The reasons set forth were that an efficient inspector of meat must, *prima facie*, be a good comparative pathologist. That the superficial knowledge of meat inspection displayed by policemen and empirics is an item of serious danger to the public health, and not infrequently is attended with unfairness to the butcher. That it is essential for the proper inspection of butchers' meat that an extensive and definite knowledge of anatomy—such only as a complete course of veterinary studies can guarantee—should be exercised. That only those who have thoroughly studied the structure, composition, and general features of animals in health and in disease, by the aid of chemistry, the microscope, and other scientific methods and accessories of investigation, such as modern science has placed in the hands of the veterinarian, are competent to pronounce upon the soundness or unsoundness of the flesh of animals for human consumption."

Mr. J. CARTER expressed the opinion that the recommendation of the committee was a step in the right direction, but he was afraid more pressure would have to be put on the local authorities before they adopted it.

Mr. G. CARTER remarked that the subject had been well considered by the committee, and they came to the conclusion that the recommendation, as drawn out by Mr. Briggs, was such as the Society intended should be placed before them. There had also been an expression of opinion that if the various hon. secretaries of the different veterinary medical societies throughout the country would bring the matter forward for discussion at their meetings, and pass a similar resolution to that which had now been submitted, it would be productive of very great benefit to the profession. (Hear, hear.) He proposed that the resolution of the committee be adopted and acted upon.

This was seconded by Mr. MASON, who thought the secretaries of the various veterinary societies might inform them as to any action those societies might take.

The resolution was carried unanimously.

Notice to Members.

The PRESIDENT stated that there was a rule in the Society to the effect that members not attending and not sending apologies should be fined, and he thought it desirable that in future the rule should be put into effect.

A Specimen.

Mr. BRIGGS exhibited bones showing a fracture of the atlas and dentata.

The PRESIDENT then read the following paper on

Tuberculosis.

GENTLEMEN,—In introducing the subject of Tuberculosis for your consideration, I must confess to some amount of hesitation and doubt; for it is a matter of the deepest importance, and ought to be dealt with most painstakingly by myself and also by you, my brethren of the profession. I hope, however, you will excuse any shortcomings in this address, and I trust it may be the means of inducing the veterinary profession in Yorkshire to declare what are their views respecting a disease so prevalent as this is among horned cattle, and especially among milch cows. Let me say I am quite convinced it is time the veterinary profession should see that some steps are taken to eradicate entirely out of the country this most baneful disease. You ought also, I think,

to come to some definite understanding as to who are most competent to give authentic, and therefore reliable, opinions as to this disease when its existence is suspected or alleged, and should be scientifically investigated. It is a baneful malady peculiar to cattle, and is it not discreditable in the eyes of the public that when called upon to give evidence before the magistrates, veterinary surgeons are often found giving conflicting evidence upon a state of facts which are admitted by both sides to be accurate? Can we depend upon having the confidence and respect of our clients so long as such is the case? It is in order if possible to avoid such a contrariety of opinion, especially in the presence of judicial tribunals, that I invite you to assist me in a thorough and enlightened deliberation as to what Tuberculosis really is, what it leads to, and what is the prerogative of the veterinary surgeon when cases of this kind arise. Not only do I hope there will be an animated and exhaustive discussion to-day, but that even after this meeting is over, should any fresh experience arise or additional knowledge be obtained, those of us who are in possession of it will take care that it is recorded as early as possible in the recognised public journals devoted to the profession. In reading over the evidence in the recent diseased meat case at Glasgow, I was very much surprised to find that nearly all the inspectors of meat whose evidence was taken were medical gentlemen. Now, with all respect to them, I am compelled to say that I cannot for the life of me understand why they allow themselves to be placed in a position which, even from the point of professional etiquette, they ought to shun. If their candour were appealed to they would, I doubt not, admit that we have a domain of our own, and rights and privileges exclusively ours, and why they should intrude upon them entirely passes my understanding. Men like ourselves, gentlemen who are trained and skilled as to soundness of animal flesh, cannot but be more competent to give evidence in cases like that I have referred to than the family surgeon, who is only asked to interfere in such matters occasionally, and in order to bolster up a doubtful case. There are, I contend, abundant reasons why veterinary surgeons should exclusively be admitted as professional witnesses in such cases, and more particularly why they alone should be called to the office of meat inspector. (Applause.) Let me ask you now, gentlemen, to consider with me what Tuberculosis is, and I would propound to you the following questions: 1. What is Tuberculosis? and how does it affect cattle? 2. Is it infectious? 3. Is it possible to be taken into the system by ingestion? 4. Is it hereditary? 5. Would you consider the milk fit for human consumption if taken from a cow affected with Tuberculosis, whether the udder is affected or not? 6. Would you consider the flesh of an animal affected with Tuberculosis, either in its first or the advanced stage, fit for human food? 7. Is it essential that Tuberculosis should be brought within the operation and provisions of the Contagious Diseases (Animals) Act, with a view especially to compensation being paid to the owners of animals which have to be compulsorily slaughtered? As to the first point, my definition of Tuberculosis is that it is a febrile disease, attended with greater or less diffusion of granular deposits, which give rise to a slow local inflammation by the irritation which they excite. You will often find narrow-chested animals with long legs those in which the disease is most apparent. You will notice that they hang down their heads, and have a weak, hoarse cough, which is repeated if they are driven about quickly; the eyes often are bright and staring, the skin dry and harsh; and if the animal be a white one, the skin, it will frequently be perceived, is of a yellow colour. They are, as a rule, capricious feeders; the bowels respond too easily to the action of laxatives; and the milk, besides being thin and bluish, is sometimes sour; while in pregnant animals abortion ensues, and in other cases irregular œstrum occurs. 2. Is it infectious? In my opinion there can be no doubt that it is very infectious. I have seen

several cases on one farm. The farmer has kept a cow suffering from Tuberculosis for some time, and gradually the disease has extended to the others. As to the third proposition—Is it possible this disease can be taken into the system by ingestion?—I must admit that upon this point I am not prepared to give a definite answer. I must declare it to be my opinion, however, that the disease can be taken into the system by ingestion. Now, my fourth point is, Is it hereditary? My opinion is in the affirmative, but at the same time I have no proof to adduce further than in particular breeds—shorthorns, for instance—it appears to be most prevalent. Fifthly, Would you consider the milk fit for human consumption if taken from a cow suffering from Tuberculosis, whether the udder is affected or not? Now, I certainly think that the milk taken from a cow affected with Tuberculosis should not be used for family purposes. In several cases I have ordered to be destroyed animals which had become wasted and very thin, although they were giving milk rather freely. If we reflect for a moment how much the juvenile population are nurtured upon milk, we shall feel in honour bound to protect them as respects the wholesomeness of the food administered to them. I would not for a moment declare that tuberculous matter would produce Phthisis, but I am perfectly sure that it is very likely to bring on diarrhœa and sickness. In the cases of children fed from a bottle, is it not frequently the case that they look pallid and emaciated? and may not this be the result of the liquid they are imbibing being either diseased or too much diluted? Now, coming to the sixth suggestion I threw out, I must avow I do not consider animal flesh fit for human food if impregnated with Tuberculosis to any extent. Mind you. I use the proviso "to any extent," by which I intend to convey that when an animal has become wasted and nearly all the organs of the body are more or less diseased, then the meat should not be allowed to come into the market; but I do think when an animal is fat and in good condition, and when the lungs are the only parts affected, then I think the carcase might be used for human food. In such circumstances we often find the tubercle encysted, or that it has become of a cheesy nature, in which case I consider no harm could be done. On the other hand, however, so soon as the glands indicate the presence of the disease I believe that the virus is on the march, and will soon do its pernicious work. As to the seventh point which I have offered for your consideration, I must say that I consider it very essential for the welfare of the country at large that Tuberculosis should be comprehended within the Contagious Diseases (Animals) Act, whereby I think the most effectual means would be provided of stamping the disease out. It is my belief that an aged cow kept upon a place for any length of time affected with Tuberculosis is likely to be very contagious to the neighbourhood. If there were legal powers to prevent such an occurrence as this the milk consumers would most likely have the advantage, to a greater extent than at present, of being supplied with good pure milk, and they might possibly also have the satisfaction of recognising a surface of cream such as rarely at present comes within their culinary experience. Now, thanking you, gentlemen, for your kind attention to these remarks, and sincerely hoping that good results may ensue, both to our own profession and to the public at large, I have now to invite discussion on this subject, which all must admit is of national and paramount importance.

Mr. J. CARTER thought the subject of Tuberculosis required a great deal of investigation. It was quite time something should be done in the matter. Very few members of the profession had perhaps seen so many cases of Tuberculosis as he had, and there was no doubt that where the disease existed in an advanced stage the meat should not be used for human food. He had seen two cases recently at York. The animals had only been purchased three weeks, but the lungs of one animal bore abscesses the size of

his hand, but they were not altogether hollow. The animal was nearly a skeleton. The other was nearly as bad, and the milk from or meat of such animals was unfit for food.

Mr. MASON remarked that he was connected with the celebrated Glasgow case. He believed the great question they had to consider was at what stage of the disease they should condemn, and at which pass. The lungs of one of the animals were affected, but they were firm, and the disease was in the encysted stage. The carcase of such a beast he should have felt justified in certifying as fit for food. With regard to the other, he could find out nothing about it; there was no disease about it whatever. There was a rosy hue on the left costal membrane, but they often found that in the case of animals that had been over-driven, and there was no organic disease whatever about the carcase, in fact it was one of the grandest carcases he had ever seen. They, he believed, as veterinary surgeons, had always passed carcases as fit for food when the animal was suffering from Tuberculosis in the early stage, but the scientific gentlemen who gave evidence at Glasgow stated that it did not matter in what stage; an animal suffering from Tuberculosis must be condemned and the flesh destroyed, as it was not fit for human food. It was clear that even amongst themselves as veterinary surgeons, there was great difference of opinion at present as to at what stage an animal suffering from Tuberculosis should be condemned as unfit for food. In his opinion they had a good deal yet to learn as to this disease, and no satisfactory conclusion could be arrived at until there had been much more scientific research, and the subject had been thoroughly thrashed out. He thought great credit was due to their President for having brought the subject before them for discussion.

Mr. SCRIVEN expressed the opinion that domestication under certain conditions conduced to the disease.

Mr. MASON asked if any of those present agreed with him that the disease was more prevalent now than it used to be. He would like to know whether they thought the present mode of feeding and housing had anything to do with the disease.

Mr. J. CARTER said he found the disease more prevalent among the thorough-bred short-horn breed.

Mr. SCRIVEN was of opinion it was only found to exist in animals fed on brewers' grains, housed for extended periods, and milked to the last extremity.

Mr. MASON said he had asked about feeding because of the following comments appearing, under the heading of "Agricultural Notes," in the *Yorkshire Post* of that morning: "Reference may be made to the director of one of the French laboratories, who stated his belief that cows fed upon grains become diseased in a short time; that although this food conduces to the supply of a larger quantity of milk, yet that that milk is watery, by no means so nutritive, and probably productive of consumption in man, while it is certainly unwholesome. This statement seems to have excited alarm, and protests were made against it, but a well-known French investigator (Dr. Toussaint), who is quoted by the Agricultural Adviser to the Privy Council, made certain inquiries, the results of which he stated in print. One of his suggestions was that a cow which has furnished by a special course of feeding a quantity of milk in excess of what she would furnish naturally in the same length of time, produces a fluid with an abnormal secretion, and which persons of delicate stomachs cannot consume. Again, he says milk produced from cattle feeding upon grains is milk which results from an artificial kind of feeding. It is consequently artificial, and loses some of its most desirable qualities. Then he remarks that the milk of cows fed upon grains is of bad quality, and should be absolutely rejected as a food for infants of tender age, and yet brewers' grains are one of the most general of foods used by the pro-

ducer of milk for town consumption, and for two reasons—first, because it produces quantity, which the dairyman desires to obtain without much regard to quality, and next the grains can be kept for a very considerable period, and are in very many instances purchased when they are cheap, and preserved in pits for use during the winter season. We have repeatedly seen grains taken from these pits, for mixing with the food of the cattle, when they are not only extremely strong-smelling, and as objectionable as any food can be, but abominably sour and partially decomposed."

Mr. G. BOWMAN said he had no doubt the disease was infectious. It was taken into the system by ingestion. With regard to the milk, he thought it was injurious if the udder was affected in any way. It had been decided at Glasgow that no animal affected with Tuberculosis was fit for human food ; but in Leeds if an animal had been affected with Tuberculosis, and the disease was localised, and the lungs not in an encysted state, the carcase had been passed as fit for food. He mentioned a case in which a butcher that week had given £17 or £18 for an apparently healthy bullock, but on being killed it was found to be affected with Tuberculosis, and the carcase was destroyed.

Mr. CARTER: Did he get any compensation?

Mr. BOWMAN: Not a shilling. Continuing, Mr. Bowman said he believed the Leeds butchers had drawn out a petition to be presented to Parliament, requesting that the disease of Tuberculosis should be ranked in the Contagious Diseases (Animals) Act, and pointing out that where beasts suffering from the disease were pronounced unfit for food, compensation should be paid the owners for the destruction of the carcase.

Mr. CLARKSON: To what extent?

Mr. BOWMAN: To the full extent.

Mr. CLARKSON: Would it not be an inducement for butchers to purchase such animals?

Mr. BOWMAN: Well, I really cannot say.

Mr. G. CARTER thought the subject so ably introduced by the President was a very serious one, and one which he considered was deserving of their earnest attention. They would benefit to a great extent in their study of the disease by all the assistance they could obtain from the sister profession. There could be no doubt that Tuberculosis was a specific disease, and it was transmitted only by the admission of the spores into the system of the animal that took it. With regard to the system of feeding and housing, animals were affected with Tuberculosis that had never been housed at all. He had found Tuberculosis affecting the mesenteric glands, and when there had been diarrhœa, and he had found tubercular Meningitis in young cattle. Those could not be taken to be produced by high feeding or milking. A medical officer of health had expressed the opinion to him that a great many children died every year from consuming milk from tubercular cows. He (Mr. Carter) asked if the officer knew of any children who had suffered from the consumption of such milk, and had recovered. The medical officer replied that he could point to two, who were now fourteen or fifteen years old, and who had never shown any further symptom of the disease. He (Mr. Carter) asked if the medical officer considered the children had suffered from the effects of Tuberculosis, did he not think they would in all probability have shown some further symptoms of the disease? and the medical officer replied that he thought they had not lived it down, but he could give no definite opinion. They were all agreed that Tuberculosis was infectious, but from that fact he did not think they had a great spread of the disease. He thought it was mostly from the hereditary taint in animals—the consumption of milk from tubercular cows by calves. He did not think the infection was spread much by the air, although he had known cases in which it undoubtedly had, but undoubtedly it was possible to be taken into the system by ingestion. In his

opinion, if the udder was not affected there was no danger in using the milk. If there were any tubercles in the mammary glands whatever he would condemn the animal, but if the animal were affected with Tuberculosis locally, in the lungs and the pleural membrane, and he found no evidence of tubercular deposits in any other part of the body, and the animal were well nourished and the flesh firm, he would say it was fit for human food. If it were possible for Phthisis to be produced in human beings by the consumption of animals affected with Tuberculosis, why, he asked, did they not find more cases of it in the human subject? Was it not a fact, he asked, that Phthisis in the human species was decreasing? Seeing the large number of animals that were affected to a slight extent with Tuberculosis and consumed for food, it looked very strange that there should not be more cases of Phthisis if it could be produced by the consumption of tubercular flesh. If there were any tubercular deposits in any part of the flesh, or the animal were poor and weak, and the flesh did not sit well, he would condemn it, but if no suppurative changes had taken place he would pass it.

The PRESIDENT referred to the difficulty of diagnosing cases of Tuberculosis, and of the danger of confounding the disease with Pleuro-pneumonia. Time after time he had been confident he had a case of Tuberculosis to deal with, and it had ultimately turned out to be Pleuro-pneumonia, and *vice versa.* He thought they would agree with him that in many cases it was impossible to diagnose whether they had a case of Pleuro-pneumonia to treat, or Tuberculosis. He did not think it was possible to differentiate with certainty.

Mr. BOWMAN described the case of an elderly man who was suffering from Tuberculosis. He had several dogs, and was in the habit of chewing meat, and then giving it to his dogs to eat. The result was that the dogs showed every indication of suffering severely from the same disease.

Mr. MASON recollected a case in which a lady suffering acutely from Consumption had occasion to frequently use a spittoon. Her dog was in the habit of licking the spittoon, and it ultimately died from Tuberculosis.

Dr. WATTS (Medical Officer of Health for Dewsbury) said he accepted the invitation of their President to attend the meeting, not to take part in the discussion, but to obtain information on the important subject of Tuberculosis. With regard to cases of Phthisis, they found it in children not fed very much on milk, but in children belonging to the lower classes, brought up anyhow. He did not say that impure milk from diseased animals would not produce it, but he thought they should not load the cow with too much blame. The question of dealing with the flesh of animals was an important one, and the subject was getting more important because such cases were continually cropping up, and they should have some definite system to work on. When the tubercule was encysted he took it that the disease was in a dormant state, but the disease must still exist in the animal, and the question was whether the animal should be condemned at that time. Unfortunately, perhaps, as a medical officer of health, he was in the particular position which they seemed to deprecate so much.

Mr. PICKERING thought with regard to the infectious nature of the disease there must at first exist a susceptibility in the subject to the disease, and with regard to the hereditary taint susceptibility must exist as well as defective sanitary arrangements if the disease progressed. With regard to the injurious effect of consuming the flesh or milk of animals suffering from Tuberculosis, he thought it depended greatly upon the quantity of the milk or food taken. Along with the affected meat or milk there were large quantities of other food taken, and might it not be, he asked, that the one counteracted the possible ill effects of the other? He might say that the conclusion arrived at by the York medical profession was that Tuberculosis ought to be included

in the Contagious Diseases (Animals) Act, and it was also decided that veterinary surgeons were the persons best qualified to inspect as to the sanitation, etc., of cow-sheds. He would like to ask the meeting whether they considered it was necessary the hereditary taint should exist in animals or human beings, as a condition of the subject becoming affected with Tuberculosis.

Mr. BRIGGS thought it was clear the disease of Tuberculosis might arise independent of infection, and if that was so they would never stamp the disease out if they included it under the Contagious Diseases (Animals) Act. They were, perhaps, apt to think that it was the animals affected with Tuberculosis that went into the market, but he maintained that it was not so. It was hard lines, no doubt, for the butcher who gave £17, or £18, or £20 for a beast, and who ultimately had it condemned on account of its suffering from Tuberculosis, but he did not see how the difficulty was to be met by the Contagious Diseases (Animals) Act, until it was proved that it was due to contagion and contagion only. He did not know what their opinion was, but he was under the impression that the disease would accrue from bad surroundings, bad ventilation in a mistal. It might be only hastening on a complaint latent in the system, but as to that they could not say. He agreed that it was difficult and almost impossible to diagnose some cases of Tuberculosis and Pleuro-pneumonia, though he never saw the temperature above 103 degrees in cases of Tuberculosis yet. With regard to the carcases of animals suffering from Tuberculosis, he said he would condemn all such animals, however slightly they were affected with the disease. It did not follow that because a parasite settled on the lungs the whole carcase was not affected, and all such carcases should be burnt, being certainly unfit for food.

Mr. GREENHALGH pointed out that a large proportion of the animals slaughtered—at Leeds at any rate—were affected with Tuberculosis to a greater or less extent, and if they condemned all of them it would be not only a very serious thing for the seller and buyer, but also for the consumer.

On the motion of Mr. BRIGGS, seconded by Mr. SCRIVEN, a hearty vote of thanks was accorded to the President for the able manner in which he had brought the subject before the Association, and the proceedings terminated.

W. F. GREENHALGH, *Hon. Sec.*

SCOTTISH VETERINARY MEDICAL ASSOCIATION.

Tuberculosis in Animals.

AT the last meeting of the above association held in the London Hotel, Edinburgh, Mr. C. Cunningham, president, in the chair, consideration was taken of a motion by Professor W. C. Williams, that the society, thoroughly believing that Tuberculosis was a contagious disease, should urge upon Government to stop the sale of milk from animals suspected of being infected, to suppress the consumption of meat from tubercular animals, and to give compensation for animals slaughtered.

A discussion ensued, in which the secretary, Mr. RUTHERFORD, said they would require to be satisfied that Tuberculosis was hurtful both to their herds and to mankind.

Mr. POTTIE, Paisley, asked if they could stamp out an hereditary disease. He denied that Tuberculosis was a contagious disease, because his experience was that the cases were isolated. It would cost Renfrewshire about £1,000 a year if Tuberculosis were placed under the Contagious Diseases Acts.

Mr. ANDERSON, Glasgow, said he was inspector for the Glasgow district of Lanarkshire, and in and around Glasgow he believed that 25 per cent. of the cows were infected with Tuberculosis. He strongly recommended that Government should introduce the disease into the Acts, to prevent its spread among cattle.

Mr. ROBINSON, Greenock, cited the case of a cow which he knew to be so badly tuberculosed that he ordered her milk to be destroyed. A servant thought it would be a sin to throw away the milk, and she fed a calf upon it, with the result that the calf died, the worst specimen of Tuberculosis he had ever seen. In that case the disease was not derived from heredity. In 1874 the magistrates of Greenock gave him *carlte banche*, and since then not an ounce of tuberculosed meat had been eaten in Greenock, unless it were smuggled in. In the same time they had reduced the death-rate of the community from 18 to 13·02 per 1,000 per annum.

After a long discussion, Professor WILLIAMS agreed to modify his resolution to a recommendation to Government to place Tuberculosis under the Acts, and to condemn the use of the milk of all tuberculosed animals, and the flesh of all animals badly tuberculosed, but to allow the flesh of animals only locally affected to be used: and this was adopted.

ROYAL COUNTIES VETERINARY MEDICAL ASSOCIATION.

A MEETING of the above Association was held at the "Crown and Thistle Hotel," Abingdon, on Friday, 26th July last, G. A. Drewe, Esq., President of the Association, in the chair. There were also nineteen members and three visitors present. Messrs. A. L. Butters (Paddington), J. S. Hurndall (Blackheath), G. Rees (Staines), and W. Western (Bracknell), were unanimously elected members of the Association.

A communication was read from Mr. Dudgeon, Hon Sec., North of England V.M.A., calling attention to the fact that the meetings of that and the Royal Counties Association clashed, and stating that they would be willing to alter the date of their November meeting if the Royal Counties would alter the date of their February meeting. During the discussion of this subject, which was favourably received, it was stated that a number of Associations had no fixed dates for holding their meetings. Sir H. SIMPSON proposed that further consideration be postponed till next meeting, and that the Secretary be requested to communicate with the Secretaries of the different Associations, in order to arrange a conference to determine whether it is not possible to have dates fixed by mutual consent for their meetings. Mr. BARFORD seconded this motion, which was unanimously agreed to.

Mr. SIMPSON (Maidenhead) moved that in the event of a subscription being started for the purpose of placing a bronze bust of the late Professor Robertson in the Council Room of the Royal College of Veterinary Surgeons, a sum of not less than £5 (Five) be sent from the funds of this Association. This was unanimously agreed to.

Mr. H. J. WILSON (Newbury) submitted specimens of a diseased liver which weighed 9½ lbs. taken from a Jersey calf, nine weeks old. Also a diseased tongue taken from a yearling steer. Professor WILLIAMS said the liver was a very peculiar specimen, and one rarely met with. He believed the disease was caused in young animals by irritation set up by the remains of the umbilical cord. The tongue produced gave evidence of Actinomycosis.

It was decided to hold the next meeting in London, on the last Friday in November.

INFLAMMATION AS A REPARATIVE PROCESS.

Professor WILLIAMS gave an able address on this subject, which, he said,

was a very important one to the profession. It was stated at the National Meeting that some men worked with their hands and eyes, and some with a brass tube and a piece of glass; but although some had never possessed the tube and glass, or in other words, a microscope, that instrument was as essential to the veterinary profession as the practitioner who confined his attention to the sick box or phial. He (the speaker) had worked with the brass tube and piece of glass for the last thirty years, and he would endeavour to lay before them some of the results, the observations of himself and of many other workers, as to the changes which took place when an irritant was applied to a part. Broadly, they might define it the nutrition of the part which had been or was being acted upon by an irritant, and he might remind them that if the part were not to inflame when the irritant was applied it would be in a perverted or abnormal condition. The speaker then explained what reparative material was essential for the healing of a wound. As a result of the excitement and fever attending a wound, a large number of white corpuscles were produced by the lymphatic glands, and were formed in increased numbers when the body was under the action of an irritant. Hence this increased activity of the lymphatic system was looked upon as a curative one. Red corpuscles were produced from the white cells by ejection of so-called blood-plates. These blood-plates were colourless, and were about half the size of the red cells, being about one eight-thousand-six-hundredth part in a horse, and one six-thousand-four-hundredth part in a man. When escaped from the vessels they behaved like the white cells, forming lumps of coagula. The plates were very numerous in wasting diseases, as their development into red cells was arrested through want of strength in the patient. To return to white corpuscles, when an irritant was applied they acquired the power of migration. They wriggled through the wall of the vessel, and collected in great numbers at the seat of the irritation. They only acquired this power on being irritated, and the migration gave rise to new growths and the formation of pus. It was a well-known fact that when a part was irritated, the ordinary microbes of the atmosphere commenced to play upon that part. The lower forms of life commenced to play upon any part of the body in which the vitality had been lowered. They were the enemies; the strife went on, and it was a case of the survival of the fittest. Then the white corpuscles escaped through the walls of the vessels, and, as observed by one writer on the subject, a royal battle took place between the two. The white corpuscles were there as the army of defence. A mild irritant increased the power of the white cells to resist intrusion from without, and of destroying disease-germs. If, however, the irritant or the germ appeared in great strength, the corpuscles died in defence and carried the irritant generally away, as in pus, abscesses, granulations, etc. Without irritation of some kind there could be no healing of wounds, or new tissue-growth. To the observant men, it had been a matter of great wonder why certain diseases were so fatal. Take, for instance, inflammation of the bowels in a horse. The animal would die in a few hours. The pain did not do it, for other diseases were as painful. The reason was that in such cases the contents of the bowels were in a state of putrefaction, and the germs, gaining access to the circulation, destroyed the vitality of the blood, and death resulted from blood-poisoning more than anything else. Coagulation was also necessary for the process of repair, and blood only coagulated after the irritation and injury of the white corpuscles. Syme, one of the greatest surgeons in Scotland, came to a very practical conclusion upon this point. Syme said that when a part was wounded there was a thin discharge from the wound at first, afterwards it became "glazed." That was simply coagulation, and Syme was of opinion—and he (the speaker) thought his conclusion perfectly correct—that the lips of a wound should not be brought

together until this "glazing" had taken place. He would point out that greasy matter prevented this coagulation and process of repair. Coagulation was a proof that the blood was living and was not dead. It was concluded that coagulation resulted from metabolic change in the white cells after irritation; hence, some irritants, by inducing this change, might cause coagulation in the blood-vessels, as in pink-eye and pleuro-pneumonia. The speaker, after recommending soothing agents in acute cases, and irritants in indolent ulcers, went on to observe that the apparently destructive process on articular surfaces of joints was in reality a reparative one, as it removed the barriers to complete repair. Under the influence of slight irritation simple hyperplasia of cellular elements was observed, *i.e.*, old cells gave origin to new cells which preserved the character of their progenitors. If the irritation was more intense the old tissue was destroyed and transformed into embryonic tissue. There was then no longer hyperplasia but inflammatory heteroplasia—that was to say, the formation of a tissue which might be foreign to the part, viz., granulation tissue, which was always the same, whether the tissue from which it sprang were skin, bone, synovial membrane, etc. An inflammatory new formation was formed as follows:—Hypertrophy of the cell-nucleus, division of the nucleus, increase and then division of protoplasm, destruction of the fibres or the ground substance, formation of embryonic tissue, formation of new vessels, and cicatrisation. He pointed out that degeneration might occur when the embryonic tissue proliferates with great activity, and cells multiplied and accumulated without simultaneous formation of new blood-vessels. If the formation of the cells was rapid, many of them would never be fully developed. That which was done in a hurry was never done well.

The process of granulation was next described by the speaker. In about forty-eight hours after the infliction of an injury, such as a wound, lacerated or divided tissues would be seen in a state of disintegration, and shortly afterwards they began to separate from those which were still living. The most superficial (or in the case of a deeply-seated inflammation, the nearest) capillaries at the same time underwent a remarkable alteration. They were converted into huge sac-like cavities filled to distension with blood. Every small capillary became a prominent object from the excess of blood which it contained, and in a short time became tortuous, and had a tendency to bulge upwards, or rather outwards, on a free surface. In a few days afterwards it would be seen that these same vessels had projected still further outwards, and were recognised as granulation loops. Round about them was a dense layer of white corpuscles, and the whole process seemed to be one of distension and displacement of the capillary vessels in the part. As the vessels were thrown upwards, they carried with them a little areolar tissue which became œdematous and constituted the stroma of the granulations. The process by which this growth of new vessels was carried on was as follows:—The capillaries were formed of nucleated and endothelial cells cemented together at their edges. When irritated, these cells swell and soften, and if the inflammation continued, their nuclei multiplied and the vessels of the inflamed tissue returned to the embryonic condition, *i.e.*, they were formed of embryonic cells arranged in rows and having in their centre a canal through which the blood circulated; and these modified capillaries and small blood-vessels became the point of departure for new vessels in various ways. Sometimes the cells themselves had anastomosing canalicular processes which put them in relation to the old vessels, after which they enlarged so as to receive the blood-corpuscles. In cases—a wounded foot, for example—where there was exuberant granulation, torture was sometimes caused by the application of caustic. That was a mistake; the real remedy was in a soothing application. An exposed wound would heal without granulation, provided the super-

ficial vessels were kept in their places by accurately applied pressure, and excessive congestion prevented by the wound being kept from putrefaction. In this case the wound became covered with a pellicle of new tissue elements, and the epithelium spread over the surface without there being any more vascularity than was necessary for organisation. Granulations, perhaps at first exuberant, always contracted, and this was not merely a process of drying, but an atrophy brought about by a layer of cicatrix-like elements, mostly spindle-shaped cells. As the stems of the granulations projected towards the surface they had to pierce this layer, which during the process of repair began to contract, and in so doing constricted the capillary stems of the granulations, thus bringing about a natural atrophy. The further development of reparative material was well illustrated by the experimental organisation of porous dead materials, such as a piece of sponge, silk ligatures, dead pieces of tissue (as lung, liver, cornea), balls of worsted, etc. If they took a small piece of sponge, and placed it, with antiseptic precautions, in the peritoneal cavity of an animal, it need not excite general peritonitis. It usually became attached to a coil of intestine within a few days, and in ten days would be found to have become firmly attached to the peritoneal coat of the bowel. If cut into, a layer of organising tissue from one-eighth to one-tenth of an inch deep would be seen by this time to have penetrated its substance. The manner in which organisation was accomplished was as follows:—The first thing noticed was that the interstices of the sponge became infiltrated with blood-stained fibrinous lymph. The sponge-canals did not usually become obstructed by it, but a fibrinous network was found adhering to their walls, with many white blood-cells entangled in it. In course of time, however, this fibrinous layer gives way to the invasion of cells, both spindle-shaped and round, called by some writers true fibro-blasts. These gradually and progressively pushed their way inwards into the sponge, destroying or supplanting the fibrinous lymph. At the point where the two met the fibrine could be seen falling to pieces, becoming absorbed, and in all probability the new cells lived upon it—in fact, ate it up. According to one view, the leucocytes were consumed along with the fibrine, and took no part in the organisation, being succeeded by larger cells, originating in the pre-existing tissue, large and round whilst young, but rapidly tending to become converted into spindles. Other observers and writers, however, thought that the white cells, leucocytes, still played an important part, and that in reality they formed the whole of the reparative process, eating up the *débris* of the exudation, swelling into large cells, becoming spindle-shaped, and finally formed into tissue. This was not his own opinion. Then came the more practical observation—how were they to guide this process? Were they to encourage it? They would take a case of inflammation of the lungs. There the reparative process of itself, if excessive, might become fatal to life by destroying the vitality of such an organ as the lung. Hence this irritation, if extreme, proved destructive. In that case they might diminish the irritation, and that was the great object in the treatment of inflammation—to recognise the due amount of the irritation of the body generally, and endeavour to maintain the body in that peculiar condition. If it was extreme, the function and vitality of the part were destroyed. They could therefore diminish that risk by reducing the irritation of the part and confining the reparative process within reasonable limits. Hence their great object should be to recognise the normal state of the body, moderate any undue irritation, and allow the process of repair to go on mildly and naturally.

On the motion of Sir HENRY SIMPSON, a hearty vote of thanks was given to Professor Williams for his excellent address.

A cordial vote of thanks was also given to the President.

The members and visitors then adjourned for refreshments, and the interesting gathering shortly afterwards terminated.

H. KIDD, *Hon. Sec.*

BORDER COUNTIES VETERINARY MEDICAL SOCIETY.

A GENERAL MEETING of the above Society was held at the Bush Hotel, Carlisle, on 26th July, 1889. Present:—Mr. Jos. Donald, F.R.C.V.S. (President); Professors McCall, Glasgow; Walley. Edinburgh; Dr. Limont, Glasgow; Messrs. Robson, Penrith; J. J. Bell, Bell, Jun, and Carlisle, of Carlisle; Faulder, Cockermouth; Thompson, Aspatria (Treasurer); Hoadley, Middlesboro'; Little, Abbeytown; Croudace, Haltwistle; Young, Cockermouth; Coates, Brampton; Dawson, Carlisle; Greaves, Manchester; Troughear, High Hesket; Carruthers, Brampton; Steel, Wigton; Armstrong, Penrith (Secretary).

Mr. Steel, of Wigton, was elected a member of the Society.

It was decided that a new and complete book of rules be printed, and circulated amongst the members.

Professor MCCALL read the following paper:—

TUBERCULOSIS, AND THE DISPOSAL OF THE BODY OF ITS VICTIMS.

GENTLEMEN,—Having been informed by your Secretary that Tuberculosis had not as yet been introduced as a subject of discussion by the members of the "Border Counties Veterinary Medical Society," I thought it might be acceptable to you that I should do so.

It is a subject in which every individual is deeply interested; and upon how the flesh and milk of tuberculous cattle are dealt with, the health of the community undoubtedly, and to a marked extent, depends.

The public, by writings and legal prosecutions, have at last been awakened to the gravity of the position in which they are placed, and they will insist upon a sweeping reform in all that appertains to the inspection of live animals in dairies, and the slaughter and disposal of their bodies, as food for man.

In the work of awakening, I am glad to say that many of the members of the veterinary profession have taken a prominent part, and the same may be said of many of our medical brethren; but in both professions there are a far greater number who have either stood aloof, or taken up a position of antagonism. That there should be members of both professions who are not convinced of the evil effects of drinking the milk and eating the flesh of tuberculous animals, in certain conditions, I for one, do not feel surprised; and still less do I ascribe their unbelief to a thoughtless ignorance, or a wilful desire to pervert facts!

To those who have not had many opportunities of studying Tuberculosis in living animals and making after-death examinations of their bodies, or it may be have not put themselves to the trouble of thinking much about the malady, it is a simple matter to subscribe to the now-current views; but to those who have had such opportunities, difficulties arise which they cannot comprehend, nor can they obtain a clear comprehension by a reference to that which has been written on the subject by others.

With the earnest desire to assist others in their difficulties, and in giving expression to them, and to strengthen and correct my own views by the discussion which I hope will follow the reading of this paper, I shall discard all technicalities and treat the subject from what I consider might be called an every-day practitioner's point of view.

As no doubt most of my audience are familiar with the life-history of Tuberculosis, I shall only refer in passing to one or two points in connection therewith.

In the year 1865, Villemin made the important announcement that he had, by *inoculation*, transmitted the disease from man to animals, and also from animals to animals, thus proving beyond doubt that Tuberculosis was not only an inoculable malady, but a malady transmissible from man to animals; and I need only say that if Villemin had dared, he would at the same time have proved, by similar experiments, its transmission by inoculation from animals to man.

On reading the record of his experiments, I remember—and no doubt so do many others—the profound impression they produced on my mind, and from that hour to this I have felt convinced that Tuberculosis was an intercommunicable disease, and consequently that the carcases of cattle *markedly affected* with the malady ought not to be used as human food.

Villemin's announcement was made in the same year that "Rinderpest" appeared in this country, viz., 1865, and as during the continuance of that disease, I had in Glasgow the supervision and inspection of all carcases as to their fitness for human food, ample opportunities were afforded me of studying the various forms which bovine Tuberculosis assumes, and the structural changes which it produces in its course.

It had been the custom in Scotland, as far as known to me, to pass as fit for human food the carcases of all animals affected with Tuberculosis, *no matter how markedly so*, if the flesh appeared good; but for reasons which will be referred to hereafter, I felt constrained to adopt a different course, and accordingly condemned them. In July, 1866, in consequence of the condemnation by me of a large fat cow affected with Tubercular Peritonitis and abscesses in the mesenteric glands, and the refusal of the owner to acquiesce in the decision, legal proceedings were instituted much on the same lines as in the recent prosecution in Glasgow, and with a similar result, viz., condemnation by the Court of the carcase and its confiscation. After this decision, the carcases of all animals whose glands testified to the presence of tubercular deposits were confiscated, and this confiscation continued as long as I continued to act as Inspector of butchers' meat in the slaughter-houses of Glasgow.

I enter thus fully into these facts because they are not generally known, and because not a few individuals think that the legal proceedings in the recent trial were taken by the authorities of Glasgow without consideration, and only on account of the reports which have recently been issued by the Privy Council's Departmental Committee, and by the Paris Congress; and further, I refer thus pointedly because it has been made to appear as if the first proceedings in Scotland, as regards the condemnation of carcases affected with Tuberculosis, emanated from Greenock in the year 1874, whereas it was from Glasgow in the year 1866.

But to proceed; in the year 1868, Chauveau, after the performance of a series of most interesting experiments, proclaimed the fact that Tuberculosis was not only an inoculable disease as announced by Villemin, but that it also could be induced by *ingestion*, *i.e.*, feeding sound animals on tubercular products. Up to this time it was the almost universal opinion of the profession, that the gastric and other secretions were sufficient to destroy all living animal or vegetable organisms or poisons gaining an entrance to the body through the stomach and in the food.

Again, in the year 1881, Toussaint announced an important discovery which he had made, viz., that the organisms of Tuberculosis could be cultivated or grown outside the body of the animal, and following this up in the year 1882, Koch proclaimed that he had succeeded in separating and staining

by a special process *the organism* on which the disease depended, viz., the "Bacillus Tuberculosis."

Such may be said to be the faintest outline of the history of Tuberculosis.

Since the year 1868 to the present time, innumerable experiments have been undertaken in all countries to test the accuracy or otherwise, of Villemin, Chauveau, Toussaint and Koch's experiments and conclusions, but in the main they remain unaffected.

While admitting the accuracy and vital importance of the experiments referred to, it would probably not be far short of the truth to say that until lately the bulk of the medical and veterinary professions entertained the opinion that the Tuberculosis of the human family and the lower animals were distinct diseases, and therefore not much harm could accrue from using the flesh of tuberculous cattle as food for man.

Much was made, and is still attempted to be made, of the microscopic differences of human and bovine tubercular eruptions and their bacilli, but while admiting that there are marked differences, yet these differences are clearly of little essential importance, for innumerable experiments have proven that "tuberculous matter derived from man will produce pulmonary Phthisis, and this inoculated Phthisis can be transmitted by inoculation to other animals." The microscopic differences in the growth of the organism and the cell structures in which it is embedded or surrounded, probably, as has been suggested, are due to the differences in soil and environments, but whether or not, the result of experimental proof goes to show that human and bovine Tuberculosis are one and the same disease, and that the disease is essentially a parasitic malady.

Vegetable organisms, as is well known to all, will only grow in certain climates at certain altitudes; in other words, they can only live under certain definite conditions, and undoubtedly the organism of Tuberculosis may by inoculation be grafted on the body of many warm-blooded animals, but it can only live in a vigorous condition in the bodies of a few.

Those of us who require to make numerous *post-mortem* examinations of the bodies of the lower animals, have found tubercular deposits frequently in the bodies of all of them; but unless under direct experimental propagation, few of the various species of the lower animals exhibit marked symptoms of the malady during life, and more rarely still do they succumb to the affection.

True it is that Tuberculosis is a prevalent and deadly malady in the human subject, and also in bovines; but in horses, sheep, pigs, cats, and dogs, it is not so. From what I have observed, I incline to the opinion that the *Bacillus Tuberculosis* is an organism wide-spread in nature, that probably it gains an entrance into the bodies of most animals, but that it cannot reproduce itself and produce destructive effects in a perfectly healthy body when introduced by what I would call the natural method of propagation of the malady, viz., inhalation.

It certainly does appear that the human and bovine body furnish the most congenial soil of all animal bodies for this organism to breed in; but the fact that medical men and nurses live in attendance on consumptive patients in consumption hospitals for years and remain unaffected, proves that the healthy human body is not a fit soil for the tubercular organism to breed in, even when inhaled for weeks, months, and years.

Should, however, the medical advisers or the nurses contract a chest affection—especially a broncho-pneumonia—then their chances of escape, unless by an early withdrawal, are limited. Experience would lead me to speak in like terms of the spread of Tuberculosis in cattle by inhalation.

Tuberculosis spreads with greater rapidity in a herd of cattle than it does in a family of individuals, and at the first glance it would therefore appear that

it was a more infectious malady in cattle than in men; but I apprehend that its rapidity and malignance is more dependent on *ingestion* than *inhalation*, or rather I should state it, that both methods of propagation are in operation in its spread among cattle. Cattle have no qualms about eating each other's food, in fact, if they get a chance they will, and as *ingestion* is as certain and almost as rapid a method of propagating Tuberculosis as *inoculation*, we can understand how it is that Tuberculosis runs a more rapid course in cattle than in mankind.

It is not necessary that the mucous membrane of the stomach or intestines should be in a diseased state in order to ensure the absorption of the tubercular virus by ingestion, but I incline to the opinion that it may be necessary in order to its reception by inhalation.

In the discharge of my professional duties, I have known as many as twelve cows die of Tuberculosis within twelve months, and that out of a herd only numbering twenty-four.

As already stated, in our *post-mortem* examinations we frequently find tubercles, one or more in number, in various organs, and this, too, in all our domestic animals, and from their calcified and other changed conditions, it is evident that they have been there for a length of time. Now leaving out of sight for the present the affection in cattle, and directing our attention to what we have observed in this disease as it affects other animals, it is not only evident that these tubercles were of old standing, but that they never seriously affected either the organs in which they were situated or the general constitution. The animals were in apparent health and feeding well, it might be up to the day of their death, and it was evident that the cause of death had no connection with the presence of tubercles. There they were, however, and we were forced to admit that to all appearances they had done no harm.

Now if I am correct in my interpretation, it can only be because the bacilli had died out, or been destroyed by leucocytes or other cells or organisms more powerful than themselves. These tubercles, I repeat, we find inhabiting the bodies of all animals, and as it is generally believed that tubercles are an evidence of the pre-existence and operations of tubercular bacilli, then undoubtedly Tuberculosis is a wide-spread malady, but it does not tend to a fatal issue in a large number of the different species of our domesticated animals.

It is a point I wish particularly to emphasise, that while a considerable percentage of most animals show evidences on *post-mortem* inspection of having at some time in their life harboured the *bacillus tuberculosis*, in most of them, by the death or destruction of the organism, a fatal issue is avoided; and thus it may be said in them to be a curable disease. Turning now our attention to Tuberculosis in the human subject and in cattle, in general terms it may be said that it is in both a fatal malady. Acute or generalised Tuberculosis in all animals, in my experience, has terminated fatally. Given a case of tubercular Pleuritis, or tubercular Peritonitis, and there can, I believe, be but one termination, and that in death, and probably within six weeks, or at most three months.

But while freely admitting all this, I am of the opinion—an opinion founded on the many *post-mortem* examinations I have made—that Tuberculosis is a frequently arrested malady in cattle, as well as in other animals. Just as in horses and sheep, so in cattle, I have over and over again found a few tubercles in the lungs and liver, some calcified, but many not; the time apparently being too short, and not one speck of diseased structure elsewhere; and such being the case, I entertain the opinion that by a similar process the organisms have been annihilated in the body of the ox, as in that of the horse and other animals, and when such is the condition I am of the

decided opinion that the carcases of such cattle are fit for, and should be allowed to be sold as, human food.

In the condition of which I speak, the disease has apparently become localised.

Some pathologists do not believe in a local tubercular process, and while it may be defined, it cannot be proved with certainty by any method of examination of that body after death. What I mean is this—given a body showing a few tubercles in a fibroid, shrivelled, or calcified condition, and to all appearance the disease local and arrested; still, as a fact, we do not know that it is so, because it is possible that bacilli still inhabit that body. But while admitting all this, I still incline to the opinion that Tuberculosis is frequently a local disease. If it were not so, the excision of tubercular, or more frequently termed scrofulous joints, the scooping out of the interior of tuberculous bones, and the removal of tubercular glands, now so frequently performed on the human subject, would be of no avail; and we all know that in a large number of cases it is a success, and individuals so operated on have lived for years thereafter, and ultimately died without presenting a symptom of lung or bowel consumption.

It is, I admit, a serious position to advise the profession to take up, viz., that the carcases of cattle in whose organs fibroid or calcified tubercles may be found are notwithstanding fit for human consumption, and should be allowed to be sold for that purpose; but I must be allowed to hedge the privilege of sale around, and to the extent which I consider, comparatively speaking, safe to those who eat the flesh.

In the first place, upon whose shoulders is the grave responsibility of passing or condemning flesh food to rest? It is a responsibility involving an enormous amount of the nation's pecuniary means on the one hand, and the nation's wealth and strength on the other. To an impartial and unprejudiced mind, I apprehend the duties of the office fall as it were by inheritance to be discharged by the members of the veterinary profession; but I would advise no veterinarian to offer his services, or local authority to accept of them, who had not specially prepared himself for the efficient discharge of the duties.

To speak of policemen, butchers, or any other body of non-professional men, discharging the duties efficiently, is utter nonsense. Such persons may be made valuable assistants in the labour, but to depute to them the disposal of carcases is an act of cruel injustice to the proprietors of our herds and flocks, and to the public who consume their flesh.

Having placed at the head of affairs a duly qualified and properly trained veterinarian, we now proceed to deal with the disposal of the carcases; and firstly, *condition of body* should be set aside, and not, as at present, made as it were the pivot on which all judgment and action proceeds.

Given a case, for example, of acute tubercular Pleuritis or tubercular Peritonitis just commencing, and in the primest fat ox, in my opinion every part of the carcase should be condemned, and with as little hesitation as in the case of a lean emaciated beast. We order condemnation, because we believe that this form of Pleurisy or Peritonitis—which an expert can recognise with his naked eye—is dependent on the irritation set up by the presence of the bacilli in these great lymph sacks. We believe that they are there in their thousands, and if only a short time be given they would destroy life.

It has been attempted to be shown that we cannot, with the naked eye, distinguish between simple acute Pleurisy and acute tubercular Pleurisy; but those who have studied the subject find no difficulty in doing so, and even were it the case that a single bacillus could not be found under the microscope, we would not hesitate in maintaining our diagnosis. But bacilli are there, and if care and knowledge be brought to bear in their detection they will always be found—at least, such has been our experience.

The animal, we repeat, while living, may have appeared in the best of health, and been sold by the breeder and bought by the butcher as a typical representative of a prime fat ox or cow, and still when slaughtered, we order the condemnation of the carcase. Because even in the earliest stage of acute tubercular Pleuritis or Peritonitis, if the tubercular exudate be inoculated on, or ingested by, a sound animal it will fall a victim to general Tuberculosis; and further, because the fat, but affected animal itself, if allowed to live, would become emaciated, and also die a victim to Tuberculosis.

Some parties apparently believe that the disease can only be a local affection as yet, seeing the carcase is in such prime condition, and they consider that those who are to eat the flesh are sufficiently protected by the removal of the pleural and peritoneal membranes on which the tubercular exudate has been poured out; but may not the bacilli and their spores be circulating in the lymphatics and blood-vessels which communicate with the pleural and peritoneal cavities?

That they are not, those who say so, and it may be, believe so, have no proof to offer; but that they are circulating, those of us who believe so have proof to offer in the fact that tubercles have been found growing in the walls of the blood-vessels and lymphatics, and even in the medulla of the bones.

Professors Klein and Lingard "have found that in Tuberculosis artificially produced by subcutaneous inoculation in guinea-pigs, one of the earliest tissues containing tubercles and the tubercle-bacilli, is the marrow of bones;" and I have found tubercle and tubercle-bacilli in the marrow of the bones and in the muscular tissue of a fine prime fat ox.

By what channels can the bacilli or their spores, from a point of inoculation locally situated, reach the marrow of bones, the lungs, the covering of the brain, the bowels, and other tissues? By no other channels at present known to us, except the blood channels and in the blood stream. Upon this all-important point allow me to quote a passage or two from Professor Klein:—"This conclusion at once disposes of the assumption occasionally made, that if in an animal the lungs and thoracic lymph glands are the only organs visibly affected with tubercle, the removal of these viscera is sufficient to insure the safety of the rest of the animal's body, as far as its usefulness for consumption is concerned. Though we may not by naked-eye inspection, or even by microscopic examination be able to detect the tubercle bacilli in the muscle or connective tissue, how can we be justified in excluding their presence from the circulating blood, including the blood in the vessels of the muscles and connective tissue? What would be our reasons for saying that at the time of killing the animal the tubercular virus is not circulating in the blood and is not in transit to distant localities, say—to the marrow of the bones or other tissues destined in the natural course of things to become the seat of tubercular deposit? It must be clear from these considerations that no part of an animal in which even a single organ is visibly affected with tubercle, can be held free of the tubercular virus."

Now that attention has been particularly directed to the circulation of the bacilli, I have no doubt that tubercles will be found frequently in the marrow of the bones and in the lymphatics of fat and apparently healthy subjects prior to slaughter. Bodily condition, fatness or leanness, I repeat, should not in the least influence the inspector's opinion in disposing of the carcase of an animal affected with acute or generalised Tuberculosis.

We would also consider and condemn as unfit for human food, any carcase, irrespective of condition, in which the tuberculardeposit was found to have invaded rather extensively any organ, and although to all appearances, the disease was localised. I quite agree with Professor Klein in the view "that no part of an animal in which even a single organ is visibly affected with tubercle, can be held free of the tubercular virus and free from danger to the

consumer." It is self-evident that perfect safety can only be ensured by destruction of all carcases tainted with the disease, but I am scarcely prepared for such a sweeping reform, nor do I believe such a measure will be generally enforced.

Under the conditions I have stated, the public would be prevented eating the flesh of tuberculous animals to a large extent, and the stock-proprietor and dairyman, instead of, as at present, looking helplessly on and allowing his tubercular subjects to pine away from day to day, would awaken to the importance of instantly slaughtering all animals showing the slightest symptoms of the disease, and adopting a more enlightened system in the breeding, housing, feeding, and exercising of his cattle.

I do believe that Tuberculosis, especially in cows, is largely a preventable malady, and that the housing of them in close, badly-ventilated cow-sheds, the feeding of them upon brewers' grain, in order to obtain the largest amount of milk, and the absolute want of physical exertion as is the case in most town dairies, are the reasons for the extreme prevalence of Tuberculosis in cattle, as compared with all other animals.

If milch cows are kept tied up to the stake, as they are in Glasgow, from the day they enter the cow-shed to the day they are taken to the slaughter-house, need we wonder that the lungs of many of them show tubercles! The want of pure air and exercise is just as obviously the pre-disposing cause of the Tuberculosis in their case, as in that of wild animals caged up in menageries. West Highland cattle rarely present tubercles in their lungs on slaughter. Wild animals in their forest homes are all but exempt from Tuberculosis, but in menageries no disease destroys so many as Tuberculosis.

Now that Local Authorities are required to slaughter all herds in which Pleuro-pneumonia gains a footing, veterinary inspectors will have an opportunity of giving statistics of animals affected with Tuberculosis, and it will be interesting to note the wide differences in the various herds. In Glasgow dairies, as far as we have gone, it ranges from twenty to twenty-five per cent.

And now I desire to direct your attention to the question of Compensation. The principle of compensation for animals slaughtered, affected with a contagious disease, has been conceded, and is in operation, and I hold that no valid reason can be adduced why Tuberculosis should not be included in the list of scheduled diseases and the animals affected dealt with on the same lines as when affected with Pleuro-pneumonia.

The public health would be more benefitted by the slaughter and condemnation of animals affected with Tuberculosis than Pleuro-pneumonia, for I have yet to learn of any harm having arisen to the public by eating the flesh and drinking the milk of Pleuro-pneumonia cattle.

As business is at present conducted in the sale of animals for human food, the butcher is the greatest sufferer by this disease, and he is, to my mind, justified in raising every objection to the wholesale condemnation and confiscation of the carcases of the animals he has purchased, until an arrangement has been made whereby he will be reimbursed his pecuniary loss.

The victim of Tuberculosis is frequently of considerable pecuniary value, and generally it is bought at a full value and in open market. No protection has been given the butcher in making his purchase, and it is, to say the least, very hard to find that after he has paid his money and is only attempting to regain it, with interest for his labour, by the disposal of the carcase for the purpose for which it was legally purchased, that his honest earnings—and it may be his all—are swept away, and his position and character seriously imperilled.

As you are aware, the evidence laid before the Departmental Committee of the Privy Council, and the finding of that Committee, were both in favour of

the inclusion of Tuberculosis in the list of scheduled diseases, and the granting of compensation as in Pleuro-pneumonia. The findings of the Departmental Committee are so important and so clearly expressed, that they should be known to all; and in case they may have escaped the memory of some here present, I have much pleasure in making the following quotations:—

"In order to ensure the gradual extirpation of Tuberculosis, we are of opinion that it should be included in the Contagious Diseases (Animals) Acts for the purposes of certain sections of those Acts, so as to provide:—

"(*a*) For the slaughter of diseased animals when found diseased on the owners' premises.

"(*b*) For the payment of compensation for the slaughter of such animals.

"(*c*) For the seizure and slaughter of diseased animals exposed in fairs, markets, etc., and during transit.

"(*d*) For the seizure of diseased foreign animals at the place of landing in this country.

"The powers and responsibilities of inspectors in ordering the slaughter of diseased animals should be the same for Tuberculosis as for Pleuro-pneumonia.

"An additional argument in favour of the slaughter of diseased animals is to be found in the fact, that frequently Tuberculosis and Pleuro-pneumonia actually occur together, or are mistaken one for the other; so that, in either case, slaughter would be highly desirable.

"Further, tubercle though hereditary, is nevertheless much less contagious than the other diseases included under the Act of 1878, and it is clear, therefore, that the immediate slaughter of diseased animals would go far to stamp it out, though doubtless, owing to heredity, the stamping out process would be gradual in its effect.

"The annual reduction of the disease would probably be very considerable, and even should it not be so, that would not constitute any reason against the adoption of the proposed regulations, since, however small the effect produced, the result to the nation must necessarily be gain.

"As in other diseases scheduled in the Act of 1878, so in this, the owner should be compensated for the slaughter of a tuberculous animal at the rate of three-fourths of its value before it was slaughtered, and the valuer should shape his estimate according to its worth to the owner, *i.e.*, as a milk producer, or for any other special purpose."

And now, in conclusion, permit me to say that as it was only after considerable pressure had been brought to bear on the Lord President of the Council (by representations in writing and deputations from various Local Authorities headed by members of Parliament), that a Departmental Committee was appointed to consider this disease and other pressing questions, so it will only be after renewed pressure is brought to bear that the Government will adopt the recommendations of that Committee; and such being the case, the sooner the Local Authorities set about applying that pressure it will be the better, not only for all parties pecuniarily concerned, but for the nation at large.

ROYAL AGRICULTURAL SOCIETY.

THE following report was submitted at the last Council meeting:—

Quarterly Report of the Royal Veterinary College.

During the last quarter cases of various diseases of cattle, sheep, and swine have been received at the College, and it is a satisfactory outcome of the attempt which is being made to advance the practice of veterinary medicine

in relation to animals of the farm that at one time the accommodation which is at present available for these animals was overtaxed.

The diseases which have been under observation at the College are abortion in cows, arsenical poisoning from the use of a fluid sold as tobacco water for destroying vermin on the skin, Anthrax in cattle, a fatal disease in sheep resembling Braxy, a fatal form of skin disease among sheep, a peculiar disease affecting the legs and feet of sheep, Tuberculosis in cattle, sheep, swine, and poultry, Blackleg in young cattle, Actinomycosis in cattle, Diarrhœa in lambs from the presense of tape worms, lung worms in calves and sheep, and Swine Fever. In compliance with the requests of members of the Society, inquiries have been made by the officers of the College in reference to outbreaks of disease in different parts of the country. The following reports will indicate the character and results of the investigations :—

Abortion among Cows.

On the 12th of April an inquiry was instituted into the circumstances relating to the long-continued prevalence of abortion in a herd of milch cows. The farm where the disease appeared comprises 327 acres, of which one-third is arable and two-thirds grass. The latter is mostly old pasture, but a small quantity has been recently laid down. The farm was entered upon at Lady Day, 1885. The former tenant kept about sixteen head of breeding stock, but during his occupation, extending over ten years, abortion was only occasionally known to occur upon it.

The soil varies in character in different parts of the farm from a strong clay to sandy loam. All is drained, and the pasture land is sound and fairly good in quality. The general surface of the farm is flat, but the drains have plenty of fall and maintain a fairly dry lair.

The general health of the herd has been good, and the cows have yielded a fair supply of milk with an average percentage of butter. With respect to the mortality, it was ascertained that in 1885 two cows were destroyed on account of Tuberculosis; in 1886 there were no deaths; in 1887 one cow died from Milk Fever; and in 1888 two others succumbed to the same malady, and one was destroyed on account of disease resulting from retention of the afterbirth.

The herd is made up of Shorthorns and Jerseys. The stock is mostly home-bred. Occasionally one or two have been bought when, in consequence of abortion, the milk supply has fallen short of the requirements of the dairy.

Since 1885 ten bulls have been at service in the herd. Some were Shorthorns, others Jerseys. Abortion has not been confined to cows served by any particular animal, nor has it occurred with greater frequency in cows served by one bull over those of another.

Inquiry as to the fertility or the herd brought out a striking coincidence in the prevalence of abortion and misconception during 1887 and 1888. In this connection it appears that in 1885 no cows returned to the bull after service. In 1886 three were unfruitful, but in 1887 no less than nine came back, and in 1888 eleven. Of the twenty-three animals here referred to it is important to note that nineteen were heifers.

It will thus be seen that abortion and infertility were co-existent, a fact which needs to be borne in mind in all future enquiries with a view to determine their casual relations.

The system of feeding and general management is much the same as that in other dairy herds. In summer the cows are at pasture both night and day, and are brought into the sheds morning and evening to be milked. Here the water supply is derived from ponds fed in some instances by springs, in others

by surface drainage. There did not appear to be any reason to question its fitness for drinking purposes.

About the middle of October the cows are housed for the winter, daily exercise being allowed when the weather is fine.

The food is made up of hay or straw chaff, 2 lb. or 3 lb. of decorticated cotton and pure linseed cake, and 4 lb. to 6 lb. of mixed meal. Long ensilage and swedes are added to the food at Christmas, and in March mangolds are replaced by sweeds. All the food ingredients are said to have been of good quality and free from any obvious contamination with unwholesome matter.

On inquiry as to the use of ensilage it was found that in 1887 and 1888 this had been given to the milch cows only. As, therefore, the malady had largely prevailed among the heifers during this time, the ensilage may be fairly dismissed from consideration as having any concern with the disorder.

It was also noticed that although cake had not been used during the present year, no less than four cases had occurred up to the time of the inspection (April 12th), thus excluding this ingredient of the food also from the possible causes of the mishap.

From time to time during the prevalence of the disease search has been made for ergot, without, however, leading to its detection in any of the pastures, and the fullest consideration of all the facts and circumstances of the inquiry fails to supply reasonable explanation of the origin of this troublesome pest.

Arsenical Poisoning.

In May an inquiry was made into a fatal disease which occurred in a number of young cattle, near St. Neots.

It appears that a number of the herd having been noticed to be infested with lice, thirty-three of them were dressed with a liquid purchased from a neighbouring chemist as "tobacco water." A short time after the application had been made one of the beasts showed signs of ill-health, several others sickened on the following day, and in a day or two all of them had become more or less affected. Of the thirty-three animals dressed nine died in the greatest of agony, exhibiting all the symptoms of arsenical poisoning.

The parts to which the dressing was applied, and especially in the region of the neck, was much swollen, and in some instances the skin was completely destroyed and in a sloughing condition. Dulness, Diarrhœa, great thirst, staggering gait, and acute abdominal pain were the leading symptoms of the disorder. *Post-mortem* examination showed the stomachs and intestines to be intensely inflamed, and chemical analysis of their contents revealed the presence of arsenic. The so-called tobacco water was also analysed and found to contain arsenic in large amount.

A Disease affecting a Flock of Sheep in Gloucestershire.

Considerable numbers of a large flock of sheep had become affected with swellings of the limbs, at first rendering the skin hot, tense, and painful as manifested by intense lameness, usually terminating in death and ulceration of large patches. Spontaneous recovery is not uncommon, and the condition is not often fatal. Frequently after healing is complete there remains a much thickened limb, which depreciates the value at sale for breeding purposes. During the progress of the malady the sheep suffers much pain and loses flesh. Medical treatment favours recovery.

The nature of this disease is obscure, and requires further study. The owner of the flock in question offers facilities for further investigation, which it is proposed to prosecute.

Suppurative Disease of the Face in Calves.

In November last a disease of a fatal character broke out in a number of calves, belonging to a farmer in Essex.

The malady was confined to animals between one and three weeks old. In all twenty were affected, and ten or twelve succumbed to the disorder.

At the time of the occurrence some of the calves were being fed on linseed cake gruel, and others were taking milk from the cows.

In the majority of cases the disease was ushered in by Diarrhœa, which continued more or less severe throughout the attack. This was shortly followed by a hard inflammatory swelling on one or both sides of the face, which ultimately broke out, and discharged a quantity of thick pus, as well as a tough mass of dead tissue, or "core."

A copious outflow of "matter" continued for two or three weeks after the rupture of the abscess, leading to great emaciation and weakness, and in the majority of cases to fatal prostration.

No *post-mortem* examinations appear to have been made, and at the time of the inspection the disease had disappeared, save in one instance, where a slight tumour still remained on the face. This animal has been secured, and will be the subject of further inquiry into the nature of the affection.

Of the origin of the disease there did not appear to be any satisfactory explanation forthcoming, but inquiry brought to light the fact that all the calves affected were by one bull, and that for some time he had suffered from a discharge from the urethra.

More recently he was destroyed, and from the condition of the lungs, as described by the owner, there is every reason to think he was the subject of advanced pulmonary Tuberculosis.

Symptomatic Anthrax.

On the same farm an outbreak of symptomatic Anthrax occurred in a herd of thirty-six heifers and steers, varying from six months to three years old. The disease commenced on July 12th, and by the 18th, when the inspection was made, six animals had already died.

The first animal attacked was destroyed early in the course of the disease, when it was thought to have been struck by lightning, and the blood was allowed to remain exposed in an adjoining pasture, but whether this in any way added to the extension of the malady it is difficult to say.

The affection had not previously been known to prevail on the place, and no recent addition had been made to the herd.

At the time of the outbreak the beasts were pastured on land adjoining the River Stort, from which they received their supply of water. The pastures are low-lying, and exposed to occasional flooding.

In the spring of the present year they were, for the first time during the present occupation, dressed with London manure, but in other respects nothing exceptional had occurred in their management.

Notwithstanding a careful inquiry into all circumstances of the disease, no clue was obtained as to the source of the contagion.

Such measures of prevention as the nature of the case demanded were suggested, and material was procured from recently dead animals to carry on the experiments now being conducted at the Royal Veterinary College.

The expenses attending these inquiries were defrayed out of the annual grant made to the Royal Veterinary College.

The experiments which have been carried on for the purpose of ascertaining the best means of protecting cattle from Blackleg are not yet sufficiently advanced to justify any positive conclusion. But the results which have been obtained have an important bearing on the question of protective inoculation.

Army Veterinary Department.

Gazette, July 26th.

First Ayrshire and Galloway Artillery.—Thomas Anderson Douglas, gentleman, to be Veterinary Surgeon.

Second Lieutenant Beech, C.M.G., 21st Hussars, attached to the Egyptian Army, and late of the Army Veterinary Department, commanded the Egyptian cavalry in the engagement with the Dervishes at Toski recently, and was especially commended by the Sirdar, General Greenfell, for his services, which materially contributed to the complete victory achieved on that occasion.

Obituary.

The following deaths have been announced :—

R. Whitewell, M.R.C.V.S., Dorrington, near Shrewsbury, graduated 1841
Wm. Murch, M.R.C.V.S., London ,, 1862

Notes and News.

Anthrax in Deer.—Lord Bristol's herd of deer at Ickworth Park, Bury St. Edmund's, has been attacked by Anthrax. Nearly two hundred animals, principally does and fawns, have died. The mortality is decreasing slowly.

Stuttgart Veterinary School.—The students of the Stuttgart Veterinary School have unanimously resolved not to attend it next winter, because the expectation that it would be raised to the rank of an Academy or University (Hochschule), on the occaslon of the recent celebration of the twenty-fifth anniversary of the King of Wurtemberg's accession to the throne, has not been realised.

The Speed of American Trotting-Horses.—The *New York Herald*, writing upon the development of the American trotting-horse, recalls the "record breaking" of the last twenty-five years. When the war closed only one trotter had ever made a mile in less than 2 min. 20 sec. Flora Temple's Kalamazoo performance in 1859 was the wonder of the world. Yet the record which gave her fame—2 min. 19¾ sec.—has now become commonplace. It was reduced to 2 min. 17¼ sec. by Dexter in 1867. Goldsmith Maid first lowered it to 2 min. 17 sec. in 1871, and three years later to 2 min. 14 sec. It remained there till 1878, when Rarus trotted in 2 min. 13¼ sec. The following year St. Julien brought it down to 2 min. 12¾ sec., and the next season to 2 min. 11¼ sec. In 1880 Maud S. was crowned queen of the turf with 2 min. 10¾ sec. on her banner, which she reduced to 2 min. 10¼ sec. in 1881. For three years she was without a peer. In August, 1884, she was dethroned by Jay-Eye-See, who scored a mile in 2 min. 10 sec. But only for twenty-four hours. The next day Maud S. trotted in 2 min. 9¾ sec., and in 1885 she made her record of 2 min. 8¾ sec., which has never been beaten. From this review it will be seen that the trotting record has been reduced just eleven seconds in thirty years. But the development of the trotter is only partly illustrated by a comparison of the achievements of these two horses. During the reign of Flora Temple there was but one two-twenty trotter. Now there are scores of them. To what is this development of trotting speed due? Various causes. First, breeding, to which more thought, enterprise, and capital have been given every successive year. The horse itself

has thus been greatly improved. Then it has been greatly helped by artificial means. The track of to-day is "faster" than the old-time course. It is a mile instead of a half-mile, elliptical instead of round, and with greatly improved footing. A sulky now weighs forty pounds. It used to weigh eighty to a hundred. Then there are toe weights and special shoes designed to balance the trotter in his gait, boots, and other appliances to protect his feet and legs. Corresponding improvements have been made in harness, reins, and bits. Finally, a higher degree of skill has been attained in training and driving, all of which have combined to increase the speed of the trotter.

Horses and Music.—Says a report by German scientists: "The investigations as to the musical sense of horses have shown that that sense is very poorly developed in these animals. It has been proved beyond doubt that horses have no notion whatever of keeping time to music, and that at circuses they do not dance according to the tune, but that the musicians have to keep time according to the steps of the animals. Other investigations show that horses do not understand military trumpet signals. It is only the rider or the animal's instinct of imitation which induces horses to make the moves required by the signal, but no horse without a rider, however carefully trained, takes the slightest notice of a trumpet signal, and the same observation has been made on a large number of cavalry horses without riders."

Diphtheria from Domestic Animals.—Dr. Robinson, in his report to the sanitary authorities of the East Kent Joint Committee, writing on the communicability of Diphtheria, says: "At one isolated farmhouse the disease was concurrent with disease amongst the farm stock, with this further coincidence that, on the occasion of a prior outbreak of the disease at the same house, the cattle were also concurrently affected. The first case in another out-of-the-way hamlet was that of a boy who had been feeding dogs with the carcase of a diseased cow. In one outbreak there was a sudden explosion of the disease confined almost, if not entirely, to the consumers of milk from a particular dairy; and, on inquiry at this dairy, it was found that three cows had been ill, two of which had been disposed of by slaughter. At another locality where the outbreak was limited to two children in the same family, the father of the children had previously had care of a horse suffering from ulceration of the nostrils. Experiment has demonstrated that Diphtheria can be communicated to the lower animals, and, if conveyance from the lower animals to man occasionally takes places, some of the isolated outbreaks, hitherto unaccounted for, may have risen in this way."

A Massacre of Cats.—A terrible carnage of cats has been organised at Corbeil, not far from Paris. Two persons living in the town were bitten by a local "tabby," which was declared rabid by a veterinary surgeon, whereupon the destruction of the town pussies *en masse* was decreed by the inhabitants. It is to be hoped, however, that the people who have organised the massacre will be brought to their senses before they pave the way for a plague of rats and mice—a contingency to which their present wild and extraordinary conduct would seem to point.

Typhoid Fever in Dogs.—Dr. J. R. Roberts, of the Indian Medical Service, has published in the *Indian Medical Gazette* (June, 1889) an interesting note on the occurrence in dogs of lesions resembling those of enteric fever in the human subject. While stationed at Sialkot during the last cold weather, he was led, by the occurrence of a heavy mortality among dogs of European breeds, to make a series of *post-mortem* examinations. In a certain proportion of cases he found the following coincident lesions: (1) an enlarged, dark-coloured, friable spleen; (2) swollen, inflamed mesenteric glands; (3) large oval ulcers in the ileum; (4) swollen oval patches; (5) points of sub-

mucous hæmorrhages; (6) large intestine with submucous hæmorrhages along the crests of the longitudinal rugæ seen in the dog; (7) inflamed vermiform appendix. The animals presenting these lesions had suffered during their illness from continued indisposition, increasing debility, distaste for food, vomiting, and stools which, if passed by a human patient, would be at once pronounced typhoid, though this was by no means invariable, as constipation might be present. The temperature might be high—in one case it was 104·5°—but temperature in dogs, though normally about 100°, can easily be raised to 103° or higher by exercise. About four years ago Mr. Bland Sutton communicated to the Pathological Society of London a paper on the occurrence of a disease in monkeys and in beavers, which he identified with the Typhoid Fever of man; he also observed the lesions in a tiger in a solitary case. The only symptoms observed during life were diarrhœa and hæmorrhage, but it was not possible to make careful clinical observations. He pointed out that M. Serres had recorded the occurrence of Typhoid Fever in monkeys, dogs, and cats, and had made some extended observations during an epidemic which occurred among the monkeys in the Musée d'Histoire Naturelle, in Paris; the symptoms observed were diarrhœa, increased frequency of pulse, and fever, ending almost always in death. Dr. Roberts suggests that if further examination should prove that dogs, as he suspects, are liable to Typhoid Fever, that fact would help to explain the continued prevalence of the disease in Indian cantonments, in spite of the sanitary precautions taken.

Dangerous Hydropathic Treatment.—A curious scene was lately witnessed on the beach at Folkestone, Kent. A man, apparently a dealer or carrier, took down a somewhat infirm-looking horse for the benefit of a sea-bath. As the animal did not seem to relish the idea of cold water externally applied, the owner carefully muffled up not only the eyes but the whole head in a kind of bag. The end of the halter was then given to some people in a boat, who towed the unhappy creature into the briny deep. Before many minutes had elapsed the bag got wet, and poor Rosinante was effectually suffocated, and sank to the bottom like a stone.

The Dresden Veterinary School.—By a royal decree, this school has been raised to the grade of a university (*Hochschule*), like those of Hanover and Berlin.

Sustenance Requirements.—Experiments show that for mere sustenance a cow of 1,000 lb. weight must digest about 8 lb. of nutritive material from her food, to supply which the food must contain about 17 lb. of dry organic matter.

Transport Damages.—During the year 1888 no fewer than 2,666 animals were thrown overboard, 169 were landed dead, and 1,113 had to be killed on landing, from injuries they had received, in connection with the foreign cattle traffic from Canada and the United States to this country.

Cancer and Age in Animals.—An instructive monograph on tumours in the lower animals, by Dr. Plicque, appeared recently in the *Revue de Chirurgie*. Amongst the more interesting definite facts included in his paper, are the subjects of Melanosis and the relation of Cancer to age. Melanosis, so malignant in man, is far nearer the innocent type of tumour in animals, especially in the horse. A melanotic nodule on a spot subject to irritation by harness sometimes disappears when the harness is adjusted so as to rub the new growth no longer. This phenomenon has even been observed after the growth has begun to ulcerate. Other tumours, especially Sarcoma and Carcinoma, are often more intensely malignant in animals, especially the horse, than in man. Animals protected by the resources of civilisation, so as to

live to an old age, rarely, if ever, met with in nature, are especially subject to Cancer. Indeed, Dr. Plicque finds distinct evidence that age is far more predisposing to Cancer in beasts than in man. Bouley, a great French veterinary authority, believed, on the ground of long observation, that dogs are doomed to Cancer if they live to old age and are not killed by some acute pulmonary or gastro-intestinal affection. The cat, often cherished and kept alive when old and miserable, is also very subject to Cancer in age. Statistics show that Cancer is far more frequent in the carnivora than in vegetable eaters. This statement, as Dr. Plicque is careful to explain, is liable to mislead the pathologist; indeed it is a capital example of a statistical doctrine eminently calculated to deceive the thoughtless. For, if we only note what animals are mentioned above in this paragraph, the truth will become apparent. Old cats and dogs, carnivorous animals, are kept alive through a somewhat misguided philanthropy or rather zoophily. But an old horse is seldom favoured in this doubtful way, and cattle are killed, or ought to be killed, when they are young and tender. The herbivora have little chance of living long enough to have Cancer.

A Snake in the Body of a Calf.—A short time ago Mr. John Hammon, salesman, of Stanford, bought a cow and calf of Mr. Bowes, of Elham, Kent. He subsequently noticed that the calf was doing badly, and it seemed as if it was dying. He gave it a dose of medicine, and to his astonishment and that of others who were attending the calf, a dead snake, nearly three feet long, came from the animal. The calf is now alive and doing well. It is supposed that while the calf was lying down the snake was attracted to its mouth by the milk it had been sucking and was swallowed.

Prussic Acid from various Plants.—Besides bitter almonds and laurel leaves as sources of prussic acid, M. Lorissen has recently found that a very large number of plants, belonging to no less than *fourteen* different families, and including species of *Arum*, *Poa*, *Ribes*, *Euphorbia*, *Vicia*, *Ricinus*, *Lucuma*, *Chardinia*, *Ximenia*, *Rhamnus*, *Aquilegia*, and several others, are capable of yielding notable amounts of prussic acid when distilled with water. Hitherto this fact has been entirely overlooked by chemists.

Professor Perroncito.—We have much pleasure in announcing that the eminent Italian veterinarian, Professor Perroncito, whose name has been so closely associated for many years with investigations into the parasitic diseases of animals, has been appointed to the Chair of Parasitology in the University of Turin.

Professor Lafosse.—The Academy of Medicine of Paris has honoured itself, and conferred honour on the veterinary profession, by electing to membership Professor Lafosse, late director of the Toulouse Veterinary School, and author of a remarkably able and extensive work on veterinary pathology.

Veterinary Research in Italy.—The Italian Minister of Agriculture, in conformity with the proposal made by the Commission appointed to inquire into animal diseases, has granted to the veterinary schools of Turin, Naples, Pisa, and Modena, the funds necessary to enable teachers in these institutions, and who are members of that Commission, to initiate or to continue studies or researches with regard to obscure infectious diseases.

Academie des Sciences of France.—In the *Seance* of July 1st, the French Academy of Sciences elected as National Correspondent in the Section of Rural Economy, Professor Arloing, director of the Lyons Veterinary School.

Rabies in Turkey.—It was for a long time believed that Rabies was un-

known in the East, and especially in Asia Minor. In "Rabies and Hydrophobia" we offered evidence to prove that this was not so, and since that work was published further proofs have been accumulating to show that, though perhaps rare, the disease is only too well known. Zœros-Pasha has, in fact, established an anti-rabaic institute at Constantinople, with the object of protectively inoculating, after Pasteur's method, persons who have been bitten by rabid dogs. Already forty-one people have been so treated, and of these thirty-eight were assuredly wounded by mad dogs; not one of these persons has died. Four of them were bitten by dogs which bit other persons; the former are alive and well, while the latter have succumbed to Hydrophobia.

Correspondence.

SKIN DISEASE IN QUEENSLAND.

SIR,—I read with much interest in your Journal for March last, a paper by Mr. Haslam on an equine skin disease in India, and which appears identical with a disease exceedingly prevalent in horses and cattle in this colony, extending over an area of more than a thousand miles in length of all the land having a watershed to the sea-coast, and extending towards the interior of the colony, in some cases 500 miles. As in India, the disease is very difficult to cure; and although it yields, temporarily to various applications, it, in a very large majority of instances, reappears in the same animals with a return of the humid weather in the following summer.

A Board was appointed by the Government last year to inquire into the disease, and I forwarded to you a copy of that Board's report, which, however, you did not publish. I forward by this mail another copy of the report, in the hope that you will at least summarise it if you cannot find space for it in its entirety.

The importance of discovering a permanent cure, easy of application, will appear when it is explained that at least a hundred thousand horses and half a million cattle are suffering from it in this colony and New South Wales, and that a majority of these are running wild, in a state of nature; hence the difficulty of applying any remedy in a very large majority of cases.

The injury caused to the hides by the disease is such as to cause serious loss to tanners.

I may state that it disappears in the winter months—June to October—but only to reappear in summer, as above stated.—Yours respectfully,

P. R. GORDON,
Chief Inspector of Stock, Queensland.

ACARUS FARINÆ IN ONE FORM OF PUSTULAR STOMATITIS OF THE HORSE.

SIR,—Mr. Edgar in his excellent paper on "Some Contagious Skin Diseases of the Horse," in the VETERINARY JOURNAL for August, has called for further explanation from me regarding the nature of the acarus I noted in one form of Pustular Stomatitis among horses when stationed at Woolwich some years ago, and subsequently in India. I will briefly state that my acquaintance with this parasite leads me to these conclusions, viz. :—

That, although I had the anatomical features of the acarus to guide me, and of which I gave as fair a representation as I could on paper, I was not then sufficiently conversant with the classification of acari to be able to suggest a designation for the one I had before me, beyond saying that it was an acarus (VETERINARY JOURNAL, 1882).

Coming across the same parasite, in the same disease, some years later,

when I was in India, led me to inquire more closely into its characters. In all our veterinary text-books I could find no description of the acari to tally with the appearances presented by that I had before me. I naturally turned to what few medical books I had in my possession, and here I found that in shape of head, body, and in the number of joints possessed by each limb, the organism I was dealing with was similar to the *acarus farinæ*.

I examined some bran then supplied to the horses, which was musty-looking, and found the same acarus present in it. Why the acarus found in the bran supplied alike to all the horses was seen to give rise to the disease (Pustular Stomatitis) in one or two only, and not in the rest, I am unable to explain; and I agree with Mr. Edgar in thinking that "the presence of acari upon the skin does not in itself constitute disease," and would add that, the detection of the acarus in the disease on two different occasions, together with its association with the bran used for the horses as noted by me, suggest at least one thing, that we cannot continue to issue bran containing these acari to the horses when cases of Stomatitis are reported in which similar acari are found.

R. W. Burke, M.R.C.V.S., A.V.D.

Camp, Glenbeigh, Co. Kerry, Ireland.

MENSTRUATION IN ANIMALS.

Dear Sir,—From the study of comparative menstruation, we are easily led on to consider the comparative male generative functions. It seems to me that man and some of the lower animals, on account of civilization and other causes, are in a peculiar condition as regards their sexual passions. Undoubtedly, many men are prevented, by sundry considerations and circumstances, from indulging their natural sexual desires. It is well known that such people are subject—provided they are healthy—to occasional seminal discharges during sleep.

It occurred to my mind to endeavour to satisfy myself as to whether the lower animals are also subject to these involuntary seminal discharges. Men who sleep in rooms above stallions' stables state that these animals will sometimes, in their dreams, make noises and become excited in a manner similar to their performances just prior to copulation; but whether there is any discharge of semen they are unable to say.

I have seen a bull, which was constantly kept with *only* four cows, have erections of the penis and a subsequent discharge of fluid, which I *believed* to be semen.

Dogs of mine have shown, occasionally, great sexual desire, as evidenced by staying away from home for two or three days consecutively; and I have afterwards discovered that they were paying their attentions to some bitch on "heat." Frequently I have seen these animals dreaming. But whether there was any discharge of semen I am unable to state.

The vesicules seminalis in the lower animals must become overcharged with semen, and if it is not expelled in the same way, as with man, what becomes of it?

Methinks if young men—veterinary students included—could believe and realize the awful consequences of syphilis, of two evils—prostitution and involuntary seminal emissions—they would choose the least.

Proceeding now to a few remarks in reference to menstruation:—

It seems to me that all animals, woman included, have periods more or less varied of menstruation.

To me it seems a very interesting fact that at a very early embryonic period, both sexes possess true male and female glands.

I am making enquiries as to menstruation in mules, but I must honestly admit that I know very little about these animals. Perhaps some of the readers

of the VETERINARY JOURNAL would kindly assist me by giving information through that medium, as to this subject of menstruation in the mule.

Kangaroos seem to be gradually passing from the primary—if it was primary—hermaphrodite condition to the *ordinary* generative condition of mammals. They appear to possess inferiorly evolved sexual organs. Surely it would be hard to find a more peculiar and interesting fact than that connected with the mode of transference of the immature embryo to the marsupial sac, occurring, as it does, about thirty-eight days after impregnation.

Also, it is interesting to remember that kangaroos resemble birds, in having only one orifice for the exit of fæces, urine, and generative products.

Whether, in the spawning of fishes, egg-laying in birds, the "heat" or "rut" of the lower animals, or the menstruation of the human being, ovula become developed and are shed, whether they be fructified or not, we cannot help coming to the conclusion that the period of heat is perfectly analogous to the period of "menstruation." Such is the purport of a letter written in a former article in the VETERINARY JOURNAL, and with the writer I thoroughly agree.

It has been ascertained that in the higher monkeys, when they do not suffer through captivity, the menstrual flow is almost—sometimes quite—as copious as in women, and is of a similar character.

But that later "change" which takes place in women has not, so far as I know, been carefully noticed in the lower animals.

I refer to the time, generally between the age of forty-five and fifty, when she ceases to have the usual monthly flow.

It may have been noticed in our subjects, but it seems to me that it does not produce such a marked effect upon them as in the case of women.

"SELF-RESTRAINT."

FOREIGN AND COLONIAL PRACTITIONERS.

SIR,—In the report of the meeting of the Royal College of Veterinary Surgeons held July 1st, 1889, the question of recognition of colonial and foreign colleges was brought forward by the President. He is reported to have said, that as soon as a school was recognised the College would be compelled to recognise graduates of that school on the payment of five guineas as a registration fee. Now this matter requires careful consideration, and as I have some knowledge of foreign and colonial schools, I think it only right to draw attention to the fact that although some of the schools have their teaching and examining bodies up to a fair standard, still, before graduates be permitted to practise in Great Britain, they should be compelled to pass the final examination of the R.C.V.S., which, if they are not able to do, they certainly are not entitled to be recognised.

In human medicine certain foreign and colonial colleges are recognised, but before their graduates are permitted to practise in Great Britain they must pass the examination of one of the licensing boards. The same rule might be applied to graduates of veterinary colleges when the Council is satisfied that the period of study prescribed is adequate, and the Matriculation and other examinations are sufficiently stringent.

I may remark that consulting the prospectuses of the colleges is not sufficient evidence, and more information is required before the first and second examinations are allowed off.

Some of the foreign and colonial schools only require two sessions to qualify, and the matriculation examination would be an insult to a young school-boy; the practical examination does not come near the standard of the R.C.V.S., and in some there is no practical examination at all. The numbers who receive licences to practise every year are very large; and

certainly if the Royal College is to recognise these graduates, the result will be that students in this country who fail in their final examination will "go across the water," and return armed with a diploma from one of these "recognised colleges." Apologising for taking up so much of your valuable space.

A PRACTITIONER.

EXPERT WITNESSES.

DEAR SIR,—In reading the letters in the *Daily Telegraph* in reference to the great criminal trial of Mrs. Maybrick I noticed a remark from one of the correspondents. He said there might be "expert" witnesses called by the Crown, and they not being interested either for the prosecution or defence, their evidence could not be said to be influenced by selfish motives. It seems to me and that in veterinary jurisprudence as it exists at present witnesses are often made to take the place of advocates, consciously or unconsciously. I think the idea is a good one, but whether novel or not I am unable to say.

EXCELSIOR.

PROFESSIONAL ADVERTISING IN IRELAND.

SIR,—Permit me, through the medium of your valuable Journal, to draw the attention of the veterinary profession to a form of advertising at present being carried on by a recently qualified M.R.C.V.S., in a provincial town in Ireland, and which, to my mind, is the most novel and disgraceful I have heard of. It consists in a regular system of not only circulating hand-bills in the market-place, but of pasting them on the backs of farm carts, etc., and thereby converting them into "travelling advertisements," or whatever other epithet your readers may choose to apply. Now, while I don't think that the members of our profession should be prohibited advertising, in a proper manner, I do think it is to be deplored that any member should demean himself in resorting to a practice, which must be more or less degrading to the profession as a body. Apologising for occupying space with what may appear a trifling matter to some.

"MEDICUS."

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from R. W. B.; J. A. Nunn, A.V.D., India; "Self-Restraint;" P. R. Gordon, Queensland; J. H. Steel, A.V.D., Bombay; R. W. Burke, A.V.D., Ireland; "Excelsior;" "A Practitioner;" J. Brett, Mansfield Woodhouse; W. F. Greenhalgh, Leeds; Prof. McCall, Glasgow; "Medicus;" H. Kidd, Hungerford.

BOOKS AND PAMPHLETS: *S. Arloing*, Le Berceau de l'Enseignement Vétérinaire; *L. Brusasco*, Trattato Teorico-Pratico di Materia Medica e Terapeutica Veterinaria; Recueil de Mémoires et Observationes sur l'Hygiene et la Médecine Veterinaires Militaires; Nouveau Dictionnaire Pratique de Médecine, etc., Vétérinaires; Procès-Verbal de l'Académie Royal de Médecine de Belgique.

JOURNALS, ETC.: *American Journal of Comparative Medicine and Surgery; Journal of Medicine and Dosimetric Therapeutics; Bulletin des Séances de la Société Nationale d'Agriculture de France; Journal of the National Agricultural Society of Victoria; Russian Journal of Veterinary Medicine; Lancet; Journal de Méd. Vétérinaire et de Zootechnie; Annales de Méd. Vétérinaire; Wochenschrift für Theirheilkunde und Viehzucht; Clinica Veterinaria; Echo Vétérinaire; Mark Lane Express; British Medical Journal; American Live Stock Journal; Revue Vétérinaire; American Veterinary Review; Edinburgh Medical Journal; Recueil de Med. Veterinaire; Thierarzt; Hufschmied; Live Stock Journal.*

NEWSPAPERS: *Edinburgh Evening News; Sandgate and Shorncliffe Herald; Cork Examiner; Cork Constitutional; Keble's Gazette.*

THE VETERINARY JOURNAL

AND

Annals of Comparative Pathology.

OCTOBER, 1889.

PROPHYLAXY OF BOVINE CONTAGIOUS PLEURO-PNEUMONIA.*

BY PROFESSOR A. DEGIVE, BRUSSELS VETERINARY SCHOOL.

For the fourth time the International Veterinary Congress has inscribed in its programme the question of prophylaxy of the contagious Pleuro-pneumonia of cattle. The meetings at Hamburg (1863), Zurich (1867), and Brussels (1883) not having given to this important question the solution it demanded, it is evidently required to submit it to a new examination.

If we consider the results which have been obtained in these later years in some neighbouring countries, notably in Switzerland, in the Grand Duchy of Baden, in Alsace-Lorraine, and in Holland, it may be affirmed that the time has come when, provided it is desired, the disease may be, if not completely stamped out, at least diminished to such an extent as to render it very little prejudicial to the interests of individuals and to agriculture. But to achieve this result it is indispensable that efficacious measures should be adopted in each one of the various tributary countries, with regard to their cattle traffic. In fact, what is the use of attempting the extinction, the complete extinction of Pleuro-pneumonia in a country, if it is not effectively combated in those with which it traffics ?

It will thus be seen that an efficacious preventive system, established on the bases agreed upon by *an International Sanitary Convention*, must constitute the best means that can be employed to get rid of bovine Pleuro-pneumonia, as of every other contagious malady.

* A paper prepared for the International Veterinary Congress of 1889.

In undertaking this task my object is to show, as briefly as possible, in what way such a system should be organised and brought into operation, in order to attain such a desirable result.

I. Preliminary Considerations.

The indications for the prevention of any disease being naturally deduced from the conditions and causes which determine it, I think it will be useful to recapitulate in a few words what is the *pathogenesis* of epizoötic Pleuro-pneumonia.

Like every other contagious malady, in Pleuro-pneumonia we recognise two general pathological conditions :—

1. The action of an external factor, the *virus*, the *Pleuro-pneumogeneous agent.*

2. The *receptivity*, or disposition of the organism to receive the influence of this agent.

Anything which is capable of attenuating or altering the economy may be considered as a cause of receptivity, and consequently of contagious Pleuro-pneumonia. According to the source of this micro-germ, it must be admitted that Pleuro-pneumonia, like all other contagious disorders, is developed in two principal ways—by contagion, and by spontaneous infection.

Contagion.—There is contagion when the virulent germ or *contagium* which produces the affection, is derived from a diseased animal. Science has not yet revealed anything of a precise nature with regard to the character of the Pleuro-pneumogeneous contagium, but analogy authorises the belief that this agent is an organised micro-germ, or *microbe.* What it is necessary to know, so far as the prophylaxy of the disease is concerned, is—

1. That the *contagium* is the principal cause, the only one in the majority of cases, of epizoötic Pleuro-pneumonia.

2. That the contagium exists principally in the pulmonary, pleural, dermic, hypodermic, and hepatic exudates, as well as in the bronchial secretion.

3. That it is endowed with a marked *resistance*, so that in a dry condition it may retain its virulence for six, and even nine months.

4. That *accidental contagion* generally occurs through the respiratory passages, with the air; that it may take place through the digestive organs, by the food and drink; that it may even take place through the fœtal envelopes, from the mother to the fœtus.

5. That the *transmission of the virus* is most frequently effected by *contact* and cohabitation with diseased animals; that among the latter there is a certain number in which the malady, assuming the

chronic form, may remain latent or stationary, and pass unperceived for a very long time—six months or more.

6. That transmission may also occur through *contaminated* cattle merely *soiling*, by products containing the virulent principle (foam, nasal mucus, pulmonary exudate), *places*, such as cow-sheds, pastures, water-troughs, markets; or *vehicles*, such as waggons, ships; or by *matters*, such as straw, forage, manure; or *articles*, such as head-collars, harness, curry-combs, coverings, buckets, brooms, forks, shovels, infected by the same products.

It is not established that an inoculated animal may transmit or receive Pleuro-pneumonia from other animals of the same species.

Spontaneous Infection.—I intend it to be understood that by *spontaneous infection* is implied the development of the disease by means of micro-germs which are not derived from an affected animal. These micro-germs, identical in their nature with those of the contagium, but less active, less virulent than them, may live and multiply external to the body, in certain conditions which are not yet determined. To this mode of development ought to be ascribed the appearance of Pleuro-pneumonia in those places where it had not before been observed, or where it had ceased to exist for a very long time, without our being able to invoke the intervention of germs furnished by a sick animal.

Contagion and spontaneous infection should occur the more readily when the receptivity of the organism is pronounced, and the hygienic conditions to which cattle are submitted are at fault.

Spontaneous infection, before it can be effected by means of germs less active than those of contagion, naturally demands for its production a greater receptivity than for the latter.

II. Prophylactic Measures.

The prophylaxy of Pleuro-pneumonia, like that of all microbian diseases, should conform to two general indications—ascertain the existence of the malady, and prevent its development. Hence the division of prophylactic measures into two principal categories—those which have for object the discovery of the affection, and those relating to its extermination.

1. Detective Measures.

It is an elementary principle that, in order to vanquish an enemy, it is necessary before all to ascertain where he is installed and what are his dispositions. Without this preliminary knowledge,

though we might possess the best arms possible, we will derive no benefit from them. In the present case the enemy to be sought is contagious Pleuro-pneumonia. The intrenchments of this enemy are the *diseased animals, those contaminated* (suspected of contamination), the *places, vehicles, matters*, and *infected objects.*

To arrive at a knowledge of these different intrenchments the following means may be employed: declaration, visit, obligatory inspection of cattle intended to be sold for slaughter, redhibition, notification.

1. *Declaration.*—For Pleuro-pneumonia, as for every other virulent disease, declaring its existence is the corner-stone of prophylaxy. In order that the declaration may yield all its fruit, I consider that it should not only include the affected or suspected cattle, but that it ought also to extend to every beast which has died or been killed from any cause. In the present state of affairs, the owner of a sick animal, or of one which has died or been killed, may do with it as he pleases; he may sell it to a knacker, or bury it without the police knowing anything about it. It is therefore conceivable that cases of contagious diseases, and notably epizoötic Pleuro-pneumonia, may remain unknown and escape the attention of the authorities. The obligation on the part of the owner to inform the local authority of every beast which has died or been killed because of disease, tends to obviate the serious inconvenience which the present state of things entails. There are two ways in which the desired declaration may be obtained—inflict severe penalties on those who neglect to make it, and indemnify the owners to a certain but sufficient amount to compensate them for the total loss occasioned by the prescribed sanitary measures.

2. *Visit.*—The visit which follows the declaration does not demand special attention here. Its object is to determine (1) the affected animals, suspected or contaminated; (2) the causes and conditions which have led to the evolution of the affection; (3) the places, vehicles, matters, and objects infected.

3. *The Inspection of Cattle intended for Slaughter.*—Where the inspection of cattle killed for food is not obligatory, the number of cases of Pleuro-pneumonia and other diseases which completely escape observation and are exempt from the preventive measures, must be numerous. How many owners are there who, having a sick beast, have it slaughtered for consumption, and recognising that it is attacked, or is suspected of being affected with Pleuro-pneumonia, take the greatest care to conceal the fact, and hasten to send a portion or the whole of their contaminated stock to one or more distant markets, so as to dispose of them without the

buyer being able to discover where they came from. There is only one way of preventing such an abuse—obligatory inspection of the cattle slaughtered for food.

The difficulties attending the organisation of such an inspection have been generally exaggerated. It is sufficient to see what is done is Alsace-Lorraine and the Grand Duchy of Baden, where it has now been for ten years in operation, to be convinced that nothing can be more simple and more economical in its application.

4. *Redhibition.*—This is a simple means, and one of great usefulness in certain cases, for discovering the existence of a disease. To prevent any disputes which might arise from this measure between commercial and sanitary legislation, it is sufficient, as I have already said, to harmonise things in such a way as to subordinate the latter, which is related to a particular interest, to the former, which has for its object the public interest.

5. *Information.*—When Pleuro-pneumonia or any other contagious disease is declared anywhere, it is necessary that the fact should be made known to all those who have an interest in being warned. This information may be given (1) to the inhabitants of the locality by placards or signals; (2) to the neighbouring localities by letters or circulars; (3) to all the country and to other countries, by monthly or bi-monthly bulletins.

2. Preventive Measures.

The means to stay the contagion and to prevent spontaneous infection may be divided into two principal categories—(1) those which have for their object to diminish the receptivity of the organism; (2) those which are related to the destruction of the contagium.

1. *Measures devised to give Immunity.*

There are three principal means of diminishing the receptivity of the organism for the contagium of Pleuro-pneumonia—good hygienic conditions, appropriate medication, and preventive inoculation.

1. *Hygienic Measures.*—Observation demonstrates that the proper application of hygienic laws may confer a somewhat marked natural immunity against *spontaneous infection*, and very notably prevent *contagion.*

2. *Medical Measures.*—If it is indisputable that everything which enfeebles or alters the economy promotes receptivity, it is not less certain that the intelligent administration of various tonic and antiseptic agents may so diminish it as to give the animal, if not absolute, at least very pronounced *immunity.*

3. *Inoculation.*—Clinical observation, as well as scientific ex-

perimentation, has established the fact that Willemsian inoculation invests the organism with real immunity against contagious Pleuro-pneumonia. But until there has been discovered an operative procedure which will render inoculation inoffensive, but certainly efficacious, I think it cannot usefully be employed except in the two following cases: (1) on *contaminated animals* which should not be immediately sacrificed; (2) on *non-contaminated cattle* forming part of a herd liable to frequent changes, and in which the disease has already appeared several times, as in distilleries.

2. *Measures related to the Destruction of the Contagium.*

After what has already been said as to the pathogenesis of the disease, the measures in connection with the destruction of the contagium may be divided into three principal classes, according as they apply (1) to the animals *affected*, or *suspected* of being infected; (2) to those *contaminated*, or suspected of contamination; (3) to the places, vehicles, matters, and infected objects.

(*a*) *Measures applicable to Diseased or Suspected Animals.*

When an animal is affected, or suspected of being affected, with contagious Pleuro-pneumonia, it ought to be killed as speedily as possible. Until this is done it ought to be carefully isolated, *i.e.*, separated from every beast to which it might communicate the disease. The Brussels Congress was unanimous in recognising the necessity of slaughtering suspected animals, as well as those really affected. Owing to this measure the function of the veterinary surgeon is rendered simple and easy. When he has before him a beast affected with acute Pleuro-pneumonia, there can be no reason for hesitation, and if he is in doubt as to whether it is a case of the contagious exudative disease or another form of Pneumonia, he may immediately require the slaughter of the beast, and by an autopsy satisfy himself as to the precise nature of the affection.

I agree with the Brussels Congress, that *in an infected place, every animal which shows symptoms of chest disease or fever of reaction* should be considered suspected. When the beast is killed the veterinary surgeon who makes the autopsy should decide if the flesh can be utilised without inconvenience, after being disinfected. When the carcase is considered unfit for use it ought to be either buried, destroyed, or transformed in such a way as to render it completely inoffensive.

(*b*) *Measures applicable to Animals Contaminated or Suspected of Contamination.*

In cases of contagious Pleuro-pneumonia, I estimate that we ought to look upon as *contaminated* (suspected of contamination)

(1) every bovine which has been in any place (byre, pasture, waggon, etc.) with a diseased one; (2) every beast which has been in a place recently occupied by a diseased one, and which is therefore infected; (3) every inoculated animal.

In the prophylaxy of contagious Pleuro-pneumonia, the part relating to contaminated animals is certainly the most important, as on the manner in which they are dealt with will depend, in my opinion, all the efficacy, I should say all the value, of the preventive system. To prevent a contaminated animal from spreading the contagion, and thus propagating the malady, is the capital point to be kept in view, and the essential object to realise if it is seriously desired to put an end to the ravages caused by this infamous but potent enemy, contagious Pleuro-pneumonia.

(*To be continued.*)

ANIMAL VACCINATION.

BY PROFESSOR FRED SMITH, M.R.C.V.S., F.I.C., ARMY VETERINARY SCHOOL, ALDERSHOT.

THE cultivation of animal lymph for the purpose of human vaccination has never in this country assumed important proportions. For this, perhaps, the medical profession is responsible, as I believe the feeling amongst its members is that human lymph gives better results, that inflamed arms are not so common, the virus keeps longer and better, and, moreover, it is generally obtainable.

The partisans of animal vaccination, or vaccination with calf lymph, deny the greater prevalence of inflamed arms, and urge as one great point in its favour the small risk incurred in producing infective diseases, and, moreover, that the lymph can be produced in any quantity desired.

I believe that our public vaccinators hold the view that it is just as safe to work with humanised as with calf lymph, they assuming, of course, that the greatest care is exercised in the choice of the vaccinifer. But in an operation which is so closely scrutinized by the eye of a distrustful public, one accident in using human lymph is sufficient to create a storm of indignation as difficult to control as it is easily roused.

Those of us who believe in animal lymph urge in its favour that such diseases as syphilis cannot be transmitted, and, besides, at a few days' notice sufficient material can be produced to protect many hundreds of people should an outbreak of Small-pox suddenly occur. The chance of infecting with tubercle appears to be a remote one, for we are told by Warlomont* that it is impos-

* "Manual of Animal Vaccination."

sible to produce Tuberculosis by the superficial insertion of the bacilli, and, moreover, that no one has been infected by making autopsies of tuberculous subjects. However that may be, and I should be the last to defend any practice possessing any actual element of danger, it is quite clear that where expense is no object, even the remote probability of producing Tuberculosis can be satisfactorily guarded against by the destruction of the vaccinifer. If a *post-mortem* examination reveals anything of a suspicious nature the whole of the lymph from this calf can at once be destroyed. Such is the system in vogue at Brussels, and I believe at other Continental establishments where the State owns and controls the production of animal lymph.

To Belgium we are chiefly indebted for the prominence which animal vaccine establishments occupy abroad; it was at Brussels where I first saw calf lymph being produced, and learned that this industry was under the control of, and in direct connection with the State Veterinary School.

In this country we have one or two small places started through private enterprise, and the National Vaccine Institution,* in London, an establishment one rarely hears of, and yet one which will well repay a careful visit; the sanitary and other arrangements are most perfect, and the whole place excellently conducted.

The military authorities, alive to the importance of thoroughly protecting all soldiers by efficient vaccination, have experienced during late years considerable trouble in obtaining the requisite amount of lymph for their purpose, and have, with considerable foresight and judgment, established at Aldershot an Army Vaccine Institute, which is entirely under the control of the Army Veterinary Department. Veterinary surgeons vaccinate the calves, collect the lymph from them, preserve it, and distribute it all over the kingdom and abroad.

The object I have in writing these few notes is to show how very simple the production of lymph is, and to stimulate our Schools and Agricultural Department to take up the subject, so as to meet the enormous demand which would arise were animal vaccination entirely practised.

I can only give a rough outline of the process, but it will be sufficient to indicate its simplicity.

The calves, about three months old, are kept under observation for a few days before vaccination, during which time the thermometer is diligently employed; no calf unless in robust health is

* It was here where I learned the details of animal vaccination, through the courtesy of Dr. Buchanan, F.R.S., and the officials of the Local Government Board engaged in this department, and to all of whom I beg to tender my best thanks for their invariable kindness and help.

vaccinated. Their food consists of hay, a little cake, roots, and grains, and they are kept warm and comfortable, the place being heated by hot-water pipes during the winter; a good clean bed is essential, otherwise the vesicles get soiled.

On the day of vaccination the animal is placed on a table of peculiar construction, so devised that he can readily be laid on his side and held firmly in position. Means are also at hand for getting rid of the excreta which are so freely produced at this time.

The calf is now shaved along the abdomen and inside both thighs, and when the skin is dry the vaccination may be commenced. Some operators prefer to inoculate by simple incisions with a blunt knife, and as many as eighty or so of these are placed on the calf; personally, I prefer to vaccinate a square about the size of a sixpence or shilling, and of these I put thirty or forty on one calf. Whichever method is employed, the same rules hold good in vaccinating, viz., not to draw blood, and not to place the vaccinated places too close together. Experience shows that the largest supply of lymph is produced by those vesicles placed on the rear part of the thigh, so that I always attend very carefully to these parts, for one vesicle in this position will produce more lymph than four on the abdomen. The lymph is worked into the slightly scarified surface, so as to ensure it taking, and the calf is let off the table, which is simply done by turning the table up (it works on hinges), and dropping the animal on the floor. The calf is now placed in a stall, I prefer a narrow one, and cradles placed on the neck to prevent him from getting at the vaccinated surface. The tail is also tied to one side. The feeding of the animal is not altered, and the temperature is taken morning and evening. About the third day it is evident that something is taking place at the seat of inoculation, and by the fifth day, or more correctly at 120 hours after vaccination, the animal is again placed on the table and the part gently washed to clear away any dirt. The vesicles now present a beautiful appearance, well raised, with a bright silver areola; the crust on the surface is adherent, and no signs of pus. The object is now to extract the lymph, but if we only took away the clear lymph one calf would not suffice for the vaccination of many people; in addition, therefore, to the lymph, we remove the solid pock tissue which contains all the virulent elements. To do this successfully, we clasp the vesicle firmly at its base with a pair of specially constructed forceps, remove the surface crust, wipe the vesicle clean, and the lymph commences to well up; this is now removed by a spatula or points, or tubes may be directly charged; with our spatula we also scrape the vesicle and so remove the tissue forming it. I prefer to remove the liquid and solid matter together, and when the calf is finished to grind the

whole up in an agate mortar, so as to get a uniform pulp; points and tubes may be directly charged from this. We generally keep three or four vesicles going at one time, and it takes about three hours to collect from one calf the whole of the lymph it will yield.

I keep the crusts from each vesicle, grind them up with a little glycerine and distilled water, and use them for vaccinating the next calf. They give most perfect results, and save the good lymph. This is the only point in the whole process which I think is my own; for the method of vaccinating by squares I am indebted to Dr. Renner, Marylebone Road, who most courteously showed me his process.

The yield of lymph per calf varies; it is generally sufficient for between 600 and 900 persons, sometimes more. I have obtained from one calf sufficient lymph for 1,500 people.

The only question which will trouble one now is the storage of the lymph. Experience shows that it does not keep well, and we do right in suspecting the virulence of any lymph more than one month old. This certainly applies to summer; in the winter its vitality is longer. In whatever way it is stored it should be protected from light and kept in a cool dry place.

The preservation of lymph is a most important matter to us, and I am instituting inquiries into the best method of preserving the virus. These results will be published when completed.

INJURY AND RUPTURE OF ŒSOPHAGUS IN A COW.

BY J. BRETT, M.R.C.V.S., MANSFIELD-WOODHOUSE, NOTTS.

THE following case is interesting from several points of view, viz., the usual cause of injury, length of time after its occurrence without any apparent deviation from health, sudden collapse after premonitory symptoms of short duration only, and the deceptive after-death appearances.

The beast in question was a well-bred, plethoric heifer, three years old, which fed and was milked on the morning of death as usual; the mid-day meal was eaten up; at 6 p.m. she refused all food, and gave very little milk; the attendant saw her again at 8.30 p.m., when she showed urgent symptoms of choking. He was at once despatched for help; she died at 9 p.m., before assistance of any kind could be got. I saw her at 10 p.m. The head was extended, foam and blood exuding from the nostrils, eyes bloodshot, protruding, and partially occluded by the membrana nictitans. The muscles of the head, neck, and sternum were emphysematous, the crepitation being most marked.

The thought flashed through my mind, Is it a death from "Quarter Ill"?

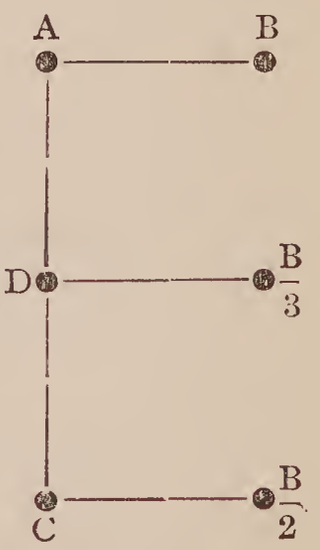
The next morning a careful *post-mortem* examination was made, with the following results: A longitudinal slit, with jagged edges, about 1½ inch long, was found towards the inferior part of the upper third of the œsophagus, and a piece of sliced turnip, about as large as the palm of the hand, was sticking in it. Following the course of the tube down the neck, small pieces of turnip about the size of horse beans were met with; these had been forced through the opening, forming a channel in contiguity with the œsophagus. This condition had evidently existed some days, as the sides of the passage were ulcerated, abscesses had formed in places, and gangrenous patches existed here and there.

An old brass brooch, with sharp cutting edges, flattened out to the size of a tumbler bottom, was found in the rumen.

PROTECTIVE INOCULATION.

BY J. A. NUNN, F.R.C.V.S., F.R.G.S., ARMY VETERINARY DEPARTMENT, ASSAM, EASTERN BENGAL.

THE subject of protective inoculation being at the present time one of interest to the general public, as a professional man one is frequently asked about the matter, and, as a rule, I have found laymen have but little idea of the theory the system is built upon; and many of them, stock-owners and others, being persons of little education and low mental capacity, are unable to follow a long explanation, and furthermore, even if they are, one has not always the time or inclination to give it. Under these circumstances I have found the following diagram useful, and it can generally be understood by any one of ordinary intelligence.



Starting from A, an animal ill from a contagious disease, if the poison or virus is taken and transferred to B, an animal or person who has not suffered from this disease, this animal or person, B, will be infected, perhaps to even a greater extent than A, so much so, indeed, that the result may be fatal. But if B recovers, for a certain time, in some cases for life, he is protected from a second attack coming from another direction. If an imaginary scale be drawn from A to C, a point is reached, either by lapse of time, disinfection, heat, or other means, at which the poison or virus loses its power; and if it is then transferred from C to $\frac{B}{2}$ it fails to produce any result. The theory of attenuation of virus or inoculation therefore is, that

between the point A, where it has its full power, and C, where it has lost it, there is an intermediate point, D, at which, if it is then transferred from D to $\frac{B}{3}$, sufficient power is retained to give the disease to B with intensity enough to protect from a second or natural attack, but yet not so virulent as to endanger life as if transferred at A, B.

"AZOTURIA;" ITS ETIOLOGY.

BY R. W. BURKE, M.R.C.V.S., A.V.D., KILKENNY.

THE disease which bears the name of Azoturia in the horse has been known for many years in England. Its pathology, however, would appear to be still in a very unsettled state, notwithstanding all that has been written upon the subject. I desire, in these few lines, to examine some of its features, and see what explanation we are able to offer with regard to the subject. I am of opinion that many factors play a part in the development of the disease, and that it may be due to one of many causes, operating variously in different cases. The teachings of physiology also say as much. It is incorrect, therefore, to lay too much stress on any one cause, and overlook all the rest, in our explanations of this disease. For neither the theory of muscle metamorphosis nor the presence of hæmoglobin in the urine will alone suffice to explain the pathology of the disease. What, then, are the conditions under which we may expect to find this disease? I will enumerate some of these only, and we shall realise the wide importance of our subject:—

Firstly. Imperfect action of the kidneys, whereby the urea of decomposed tissues and digestive materials accumulates in the blood.

Secondly. Imperfect bodily metabolism, *i.e.*, improper assimilation and improper excretion.

Thirdly. Excessive tissue-waste, following periods of rest, preceded by periods of active work.

Fourthly. Disorder of the circulation of the liver, whereby the urea manufactured in this organ is allowed to accumulate in the blood.

Fifthly. Improper grouping of food stuffs, whereby a larger supply of nitrogenous materials is taken up by the process of absorption than is required by the blood for the carrying out of the vital processes.

Sixthly. Improper action of the skin, brought on from cold and other causes impeding free circulation of the blood, which interferes with the excretory function of the skin and leads to an accu-

mulation of urea in the blood. For remember that the skin is a supplementary organ to the kidneys.

Seventhly. Sudden work following rest, which causes undue destruction of tissue, especially muscle tissue, leading to deposition of urea in the blood. Horses more often suffer from this disease following a Sunday's rest at home, where the skin has not operated freely, and less frequently in Eastern countries, where it has done so most freely at all times, aided by a high temperature and large supply of water, etc.

Eighthly. Sudden rest following regular work, whereby the substances—nitrogenous matters—derived from the food cannot be made an integral part of the tissues, as they are not required.

Ninthly. The disease is influenced by conditions of blood-pressure, and by various conditions of the nervous system.

The above are homologous causes. Whatever view we may take as to the relation between cause and effect, we must take care not to confine that relationship within too narrow a compass. So many causes operate in the body of an animal which lead to an accumulation of urea in the blood, that we may safely say that no one of those mentioned above can be regarded as more important than another. The processes of digestion, assimilation, excretion, and bodily metabolism all require our attention in studying the pathology of this disease. It is supposed to be a general derangement of all those physiological functions, which leads to an excess of urea in the blood, and to its undue presence in the urine.

The colour of the urine varies greatly in this disease, and depends on the matters present in it, chiefly urochrome and urobilin, derivatives of normal blood and found in normal urine. The source of all true pigment is the colouring matter of the blood (hæmoglobin); hence the name Hæmoglobinuria suggested for this disease by the Germans. But urine is physiologically the seat of pigment.

COMMINUTED FRACTURE OF THE LUNAR AND SIMPLE FRACTURE OF THE SCAPHOID AND CUNEIFORM BONES.

BY T. MARRIOTT, M.R.C.V.S., A.V.D., SIALKOT, INDIA.

As fracture of the above bones is of rare occurrence, the following rough notes may be sufficiently interesting for insertion in the VETERINARY JOURNAL :—

Subject.—A brown New Zealand gelding, 15.2 hands high, seven years old, the property of Major Sadlier, Queen's Bays.

History.—March 30th, 1889, the horse was in harness, and standing near the troop stables. The syce having taken the rug

off the horse, proceeded to put it under the back seat of the carriage, ready to start, when the horse finding no one near moved off at a trot, broke into a canter, and then into a gallop. After going about three hundreds yards, he was compelled to make a sharp turn. He got round the turn safely, but owing to the pace the carriage did not turn so readily, and although he tried to avoid a dry ditch—six feet wide and four deep—the conveyance simply pushed him into it, and turned, if I may use the term, a complete somersault over him. After a little trouble the horse was extricated and walked more than a mile to the Station Veterinary Hospital.

On examination I found the horse very lame on the near fore limb, the knee much swollen and painful, and although I tried for a long time to detect crepitation, the search was fruitless until 2nd April, when distinct crepitation could be heard on moving the pesiform bone.

The horse was eventually destroyed about the 15th May, and the *post-mortem* examination revealed the following fractures: Scaphoid, one triangular piece chipped off the posterior surface. Lunar, fractured in all directions into five pieces. Cuneiform, simple fracture from above to below, dividing the bone into two equal parts.

Only a very feeble attempt at union had taken place; there was an irregular deposit of ossific material upon the fractured and free surfaces of the fractured bones. The structure of the bone was normal.

The above case appears to me to be peculiar in the two following points: firstly, such a severe injury from such a trivial accident; secondly, absence of crepitation for three days when the bones were so smashed up.

REPORT ON AN OUTBREAK OF "ANTHRAX" AT MHOW, CENTRAL INDIA, AMONG THE HORSES OF THE CARABINEERS.

BY J. A. MEREDITH, A.V.D., MHOW, CENTRAL INDIA.

(*Continued from page* 174.)

Case XII.

Subject.—A grey Persian entire, aged six years. Case 550, B 23, 16th August, 1888.—Anthrax. Admitted at 11 a.m. Temperature 108, pulse 70, respirations 60; similar symptoms to others admitted, but more aggravated and acute; horse appears very ill, and was noticed first in the lines. An hour previously he showed outwardly nothing abnormal. Gave aperient pill,

Sodæ Bicarb. and Acid Carb. 10.30 p.m.—Horse no better; gave Acid Carb. 17th August, 1888, 6 a.m.—Pulse 42, temperature 106·2; no improvement; not eating; bowels not responded. 12 a.m.—Uneasy; lies down and gets up again soon; standing with his head poked out, swelling round the throat, and twitching of the ears. 18th August, 1888.—Temperature 105·4, pulse 48; discharge great from nostrils; dull; not eating; looks worse. Treatment continued with Sodæ Hyposulph. 6 p.m.—Temperature 104·4. This horse has been much the same all day; swellings of the throat and chest; discharge from nostrils continuous. 8 p.m.—Patient suddenly became restive and violent, struggling, and finally fell down and unable to rise again. 19th August, 1888, 2 a.m.—Horse much worse; swellings increased. 7 a.m.—Discharged died.

Post-mortem.—*External appearances.*—Enlargement in the pharyngeal region; skin easily detached, and upon removal the muscular tissues appeared infiltrated with yellow serosity and contained dark-coloured blood. On opening the thoracic cavity it contained a quantity of yellow fluid intermixed with blood clots, pleuræ covered with ecchymosed spots; heart soft and friable to the touch, containing a quantity of dark-coloured blood; pericardium and endocardium marked with hæmorrhagic spots; the blood vessels leading from the heart contained blood of a tarry nature; the pericardial sac contained an increased quantity of serous fluid; around the root of the lungs the tissue was infiltrated with the characteristic exudate; lungs congested, containing little or no residual air, appearing as if it had all been evacuated. The bronchi and trachea contained some frothy mucus. The thoracic and cervical lymphatics were enlarged and contained a quantity of the yellow serosity. *Stomach*, mucous membrane congested with patches of ulceration; extravasations were observed in the abdominal cavity; but this being a case of external manifestations, the intestines seemed to be less attacked, but even in this case there was a certain amount of exudate in the cavity. The *spleen* was lumpy in appearance, and the mesenteric glands were full of yellow serosity. *Liver* congested and friable. *Kidneys* soft to the touch, and the tissue round the pelvis of each was infiltrated with yellow serosity. Decomposition rapid. The mouth was full of frothy mucous of an offensive odour, and the mucous membrane before death presented a most peculiar salmon colour, which changed to dark red after death. (Bacillus Anthracis present in the blood).

Case XIII.

Subject.—A grey Persian entire, aged eight years. Case 551, B 14, 16th August, 1888—Anthrax. Admitted at 7.30 a.m. Tempera-

ture 105·2, pulse 60, respirations 38; mucous membrane very red and tinged with yellow; exhibits Colic symptoms, but shows difficulty in breathing; breath fœtid; lower lip hanging; drooping ears; distended nostrils; staring appearance, and drowsiness. Administered Magn. Sulph. 8 ozs., and at 10.30 p.m. horse showed no improvement, so gave Acid Carb. and Sodæ Bicarb.; not feeding. 17th August, 1888.—Pulse 50, temperature 103; looks much the same; eating only a little. Gave Sodæ Bicarb. 18th August, 1888.—Temperature 105, pulse 40; dull; breathing distressed; grunting; throat swollen; mucous membrane highly injected; extremities cold; eating a little grass. Sodæ Hyposulph. and Bicarb. and Acid Carb. given. 6 p.m.—Temperature 104; no improvement; swellings extending to the chest; no discharge from nostrils; treatment continued. 19th August, 1888, 10 a.m.—Temperature 102·2; throat still enlarged; appears much the same. Gave Ammon. Carb. 1 dr., Sodæ Hyposulph. 2 ozs., and ordered it to be repeated at 12 a.m. 6 p.m.—Temperature 101·3; horse much worse; swellings increasing. Gave Tinct. Aconite 20 min. 20th August, 1888.—Much worse; died at 8.15 a.m.

Post-mortem.—In this case the respiratory organs were chiefly affected; great effusion around the throat; the skin was easily removed; the effusion extending down to the chest and along the neck, the muscular tissue being stained with dark-coloured spots. The schneiderian membrane was highly tinged, and a discharge of a greenish yellow colour was present over its surface. The brain exhibited a congested appearance. The tongue and pharynx were of a peculiar lived colour; the lymphatics of the cervical region were increased in size, and contained a quantity of yellow exudate. On incising the thoracic cavity a quantity of serous fluid presented itself, the parietal and visceral pleuræ being ecchymosed. *Heart* soft and flabby, containing a quantity of dark-coloured blood, also the blood vessels proceeding from the heart; the endocardium was studded with hæmorrhagic spots; the exudate was also present round the root of the lungs, and they were congested, whilst the air tubes contained frothy mucous. The lungs presented a collapsed condition. *Digestive apparatus.*—The large veins following the intestines were full of dark-coloured blood; the peritoneum and gastro-splenic omentum were deeply stained with blood markings. *Stomach* nearly empty and the pyloric portion congested. *Liver* increased in weight, weighing 14 lbs., congested and friable. *Spleen* did not exhibit any great abnormal condition, being only a little nodulated. A quantity of exudate was present in the sub-lumbar region, and the kidneys were congested. Bladder contained urine of a treacly consistence. Blood contained the Bacillus Anthracis.

Case XIV.

Subject.—A grey Persian entire, aged six years. Case 552, B 63, 16th August, 1888—Anthrax. Admitted at 7.30 a.m. Respirations 44, temperature, 103, pulse 64, perspiration intense; mucous membrane deeply injected, almost blue; exhibits great pain and other Anthracoid symptoms. Gave Epsom Salts 8 ozs., Pulv. Zinzib. 1 dr., Hyd. Chloral 2 czs. Horse became worse about 10 a.m., and died at 1.30 p.m.

Post-mortem.—Intestinal Anthrax.—Abdominal cavity contained a great quantity of serous fluid, in which was floating about a number of blood clots; peritoneum deeply stained with blood markings. The great omentum presented a remarkable blood-stained appearance, as did also the gastro-splenic omentum; the convolutions of the mesenteric vessels were most prominent, and full of dark-coloured blood indisposed to coagulate. *Stomach* upon incision presented quite a rare condition, being congested and having a gastric tumour situated about two inches from the pyloric opening; the tumour possessed the remarkable feature of having seven openings; in the mouth of all pus of a hard and dry nature was observed. The amount of pus in the abscess would be 10 ozs. This abscess being of some duration, did not immediately interfere with digestion; a more than usual quantity of bots were present. The small and large intestines were highly injected, the lining membrane easily removed, and had sloughed in a number of situations. The cæcum contained little food or gas. The most prominent feature was the stand out-markings of the vessels of the large colon, together with the extensive exudate thrown out with them. Charbonous tumours were present round the kidneys, and the bladder contained a quantity of dark yellow thick urine, although the catheter was freely used before death. *Rectum* everted. *Liver* weighed 13 lbs., congested and friable, with peculiar yellow stainings upon its surface. *Spleen* weighed $4\frac{1}{2}$ lbs., nodulated, of the peculiar blue tinged colour; a small rupture was to be seen. The disease in this case seemed to be principally confined to the digestive apparatus, so, excepting some extravasations in the thoracic cavity, nothing greatly abnormal was to be noted. Brain and pharynx normal. The cervical lymphatic ganglia were infiltrated with the yellow exudate. The œsophagus presented its usual condition, but the mucous membrane of the mouth had a peculiar livid colour, and the tongue was protruding out of the mouth.

Case XV.

Subject.—A grey Persian gelding, aged fourteen years. Case 553, B 41, 16th August, 1888—Anthrax. Admitted at 1 p.m. *Symptoms*—

temperature 105, pulse 42, respirations 37; not feeding; dull and drowsy-looking; hanging head, with lower lip pendulent; drooping ears; nostrils dilated; mucous membrane injected; laboured breathing; extremities cold, and showing Colic pains. Gave aperient pill and Acid Carb. every three hours. 10 p.m.—Much the same; medicine repeated. 17th August, 1888, 6 a.m.—Temperature 102; pulse 30; Carb. Sodæ ½ oz. Dull, and appears to be in pain; taking little grass and water; bowels not responded. 6 p.m.—Temperature 101·4. Heavy rainfall. 18th August, 1888.—Temperature 101, pulse 44; slight swelling round the throat; no improvement; dull. 2 p.m.—Much the same, only appears more worn out. 6 p.m.—Temperature 105·1; not eating; swelling increasing; no action of the bowels; difficult breathing; grunting; patient worse. 19th August, 1888.—Gradually becoming worse. Rain continuous. Discharged died.

Post-mortem.—External Appearance.—Great œdema round the throat; muscular tissue infiltrated with yellow serosity extending down to the chest; skin easily removed from the parts; trachea contained a quantity of frothy mucous; brain congested, and effusion of blood and lymph in the ventricles; mucous membrane of the mouth stained; petechiæ on the schneiderian membrane; cervical and thoracic lymphatics enlarged and infiltrated; the thoracic cavity contained a varying quantity of exudate, in which was suspended blood clots. The pleuræ, lungs, and large vessels of the heart were of the characteristic nature, and the abdominal cavity and organs presented the usual Anthrax appearance.

Case XVI.

Subject.—A grey Persian gelding, aged six years. B 1, 16th August, 1888. Admitted at 7 a.m. Temperature 104, pulse 68, respiration 74; mucous membrane injected and yellow patches present; perspiration great; very distressed appearance, and shows other Anthrax symptoms; cannot recover. Gave Chlor. Hyd. 2 ozs. and Mag. Sulph. 8 ozs. Discharged died at 4 p.m.

Post-mortem—Intestinal Anthrax.—No external tumours, and the general *post-mortem* conditions were of a similar nature to others I have before described, a full record being retained in the record of treatment book.

Case XVII.

Subject.—A grey Persian entire, aged six years. B 2, 16th August, 1888—Anthrax. Admitted at 3 p.m. Similar symptoms to others; dull; Colic pains; pulse 46, temperature 104·2; aperient pill and Sodæ Bicarb. 10 p.m.—Much the same. 17th August, 1888, 6 a.m.—Pulse 36, temperature 104; Soda treatment continued.

6 p.m.—Temperature 103·2. 18th August, 1888, 6 a.m.—Temperature 102·2, pulse 42; looking sharper; mucous membrane injected; no swellings; breathing good; appears better; eating a little; removed him to a new ground; bowels responded. 6 p.m.—Temperature 104·1. 19th August, 1888.—Temperature at 9 a.m. 103·1; horse looks worse; no doubt the extreme wet has had some material effect; Ammon. Carb. and Hyposulph Sodæ. 6 p.m.—Worse; will not recover; Acid Carb. and Tinct. Aconite. 20th August, 1888.—Temperature 105, pulse 54; appetite quite changed. I expected patient to die last evening; treatment continued. 6 p.m.—Temperature 105, pulse 43; medicine repeated. 21st August, 1888.—Temperature 105·1, pulse 44. 6 p.m.—Temperature 106, pulse 58. 22nd August, 1888.—Temperature 103·1, pulse 48. Heavy rainfall; patient suddenly became restive and died in great agony in about two hours. Discharged died.

Post-mortem—Intestinal Anthrax.—Exhibiting the characteristic conditions of this form of Anthrax. I may mention that the appearances were intensified in this case.

Case XVIII

Subject.—Grey waler mare, aged eight years. B 65, 16th August, 1888—Anthrax. Admitted at 4 p.m. Respiration 40, temperature 104·4; breathing hard; eyes glassy; ears drooping, and general dull appearance. Gave aperient pill, and after treatment consisted in 1 dram doses of Acid Carb. 10 p.m.—Much the same. 17th August, 1888, 6 a.m.—Pulse 34, temperature 102·3; sodæ Bicarb. given. 6 p.m.—Worse; swelling in the pharyngeal region; treatment continued. 18th August, 1888.—Temperature 105·3; worse; swelling increasing; taking nothing; bowels not responded. 19th August, 1888.—Much worse; horse died at 6 p.m. Discharged died.

Post-mortem presented similar conditions to the others that exhibited external tumours.

Case XIX.

Subject.—Grey Persian entire, aged eight years. B 6, 16th August, 1888. Admitted suffering from Anthrax at 4.30 p.m. Temperature 103·3, pulse 57; dulness; drooping ears; lower lip hanging; keeps bending head and neck; mucous membrane tinged, breath fœtid, Colic pains and other usual symptoms, not any external tumours. Gave aperient pill and Sodæ Bicarb. 17th August, 1888.—Patient no better, pulse 45, temperature 103·4; eating little; treatment continued. 18th August, 1888.—Bowels responding freely to purgative. Subject is exceedingly wild, so much so

that no clinical observations could be taken, so I considered it advisable to allow him to remain quiet. Sodæ Bicarb.; treatment continued. 19th August, 1888.—Horse appears much better, eating a fair amount, and he continued to improve daily up to 8th September, when I discharged him cured.

Case XX.

Subject.—A grey Persian entire, aged nine years. B 12, 17th August, 1888—Anthrax. Admitted at 1 p.m. This horse was noticed to be somewhat sick last evening, with a temperature of 101·4; but so many horses in the troop being of this nature, I considered the case one of observation only. *Symptoms.*—Refuses food, Colic pains, and other Anthrax symptoms; temperature 104, pulse 52. Gave the ordinary Colic draught of Tinct Opii. and Spt. Æther Nit.; did not administer any aperient medicine. 18th August, 1888.—Temperature 104, pulse 35; uneasy Colic pains; gave Chlor. Hyd. 2 ozs. 2 p.m.—Much the same; no improvement; worse at 6 p.m.; cannot recover. 19th August, 1888.—Still getting worse, temperature down to 98·2. 6 p.m.—Temperature increased to 101·4; very distressed appearance; gave Sodæ Hyposulph. and Tinct. Aconite. 20th August, 1888.—Discharged died at 3 a.m.

Post-mortem.—Intestinal Anthrax in a most virulent form.

Case XXI.

Subject.—Bay Persian gelding, aged five years. F 12, 17th August, 1888—Anthrax. Admitted at 1.30 p.m. Pulse 60, temperature 107; well-defined Anthrax symptoms; gave aperient pill, followed by Acid. Carb. and Sodæ Bicarb. 6 p.m.—Temperature 107·1. 18th August, 1888, 6 a.m.—Temperature 106·4, pulse 56. 2 p.m.—Temperature 106·3, pulse 54; refuses all food; dull appearance; bowels not responded. 6 p.m.—Temperature 103·4; horse much worse; treatment continued; cannot recover. 19th August, 1888.—Discharged died at 2.30 a.m.

Post-mortem.—Intestinal Anthrax, similar appearances to the ones before described.

Case XXII.

Subject.—Grey Persian entire, aged six years. B 17, 17th August, 1888—Anthrax. This horse was admitted at 6.30 p.m. from the other horse lines. Temperature 103; swelling round the throat; dullness; refuses food; nostrils expanded; uneasy; kicking at his abdomen: distressed look; gave Sodæ Bicarb. ½ oz., Sodæ Hyposulph. 2 drs., Tinct. Aconite 20 min. in bolus. 18th August,

1888.—Temperature 103·2, pulse 44; eating grass; treatment continued every five hours. 6 p.m.—Temperature 104·3; appears much the same; eating green grass around the standing; treatment continued. 19th August, 1888.—Temperature 105; gave Ammon. Carb. 2 drs., Sodæ Hyposulph. 2 drs., repeated at 12 a.m. 6 p.m.—Temperature 104; much the same. 20th August, 1888.—Temperature 101·1, pulse 38; eating; looks much the same; Sodæ Bicarb. and Hyposulph. with Aconite. 6 p.m.—Temperature 101·1; doing well. 21st August, 1888.—Temperature 100; continues to improve; treatment continued. 6 p.m.—Temperature 102·1, pulse 46; swelling still much the same; difficulty in drinking water; eating little lucerne; treatment continued. 22nd August, 1888.—Temperature 102·1, pulse 42 at 6 a.m., improvement; treatment continued; eating; lost lot of condition; drinks more freely. 6 p.m.—Temperature 100·4, pulse 40. 23rd August, 1888.—Temperature 100, pulse 43; doing well; taking lucerne, and half-diet medicine repeated. 6 p.m.—Temperature 101·1. 24th August, 1888.—Temperature 99·3. 6 a.m.—Temperature 101·3. 6 p.m.—Medicine continued. 25th August, 1888.—Temperature 99·1; Sodæ Bicarb. only. 5.30 p.m.—Temperature 101·3. 26th August, 1888, 7.30 a.m.—Temperature 99·3. 6 p.m.—Temperature 100·2. 27th August, 1888.—Temperature 99·4, pulse normal; continues to improve. 28th August, 1888.—Temperature 100. 10th September, 1888.—Discharged cured.

Case XXIII.

Subject.—Grey Persian, aged eight years. 18th August, 1888.—Anthrax. Admitted at 6.30 a.m. Temperature 105, pulse 54; lively; eating little, but showing a number of Anthrax symptoms. Gave Sodæ Bicarb., Hyposulph., and Tinct. Aconite in bolus. 2 p.m.—Much the same, eating grass; treatment continued. 6 p.m.—Temperature 105; no improvement; medicine repeated; eating green grass from around the standing. 19th August, 1888.—Temperature 105·1; no improvement; medicine repeated every four hours. 6 p.m.—Temperature 106·1; more uneasy; strong Colic pains, swelling round the throat. 20th August, 1888.—Temperature at 6 a.m. 104·2, pulse 48; appears a trifle better; medicine continued. 6 p.m.—Temperature 104·2, pulse 49; usual condition. 21st August, 1888.—Temperature 105·2, pulse 52; no improvement; medicine continued. 6 p.m.—Temperature 104, pulse 42; treatment continued; swelling much the same, only extending down to the chest. 22nd August, 1888.—Temperature 100·3, pulse 38; swelling decreased; discharge great and green from both nostrils, steaming the head; treatment continued. 4 p.m.—

Temperature 103·4. 23rd August, 1888.—Temperature 100·3, pulse 44; doing well; treatment continued; discharge free from nostrils still, and throat much swollen; temperature 102 at 6 p.m. 24th August, 1888.—Temperature 98; doing well. 6 p.m.—Temperature 102·3. 25th August, 1888.—Temperature 99·5; Sodæ Bicarb. only; temperature 101·3, 5.30 p.m. 26th August, 1888, 7.30 a.m.—Temperature 100. 5.30 p.m.—Temperature 101·2. 27th August, 1888.—Temperature 99·3, pulse normal; no further treatment considered necessary. 28th August, 1888.—Temperature 100. 10th September, 1888.—Discharged cured.

Case XXIV.

Subject.—Bay Waler gelding, aged eight years. F 32, 18th August, 1888—Anthrax. Admitted at 7.30 a.m. Temperature 106, pulse 64; with appearance and showing unmistakable symptoms of Anthrax Fever. Gave Sodæ Bicarb., Hyposulph., and Tinct. Aconite, isolated with other F Troop horse. 2 p.m.—Temperature 106·4, pulse 44; eating grass greedily; Sodæ Hyposulph. repeated. 19th August, 1888.—Temperature 102·3, pulse 56; keeps moving head up and down; uneasy; eating still; treatment continued. 6 p.m. —Temperature 100·2; cannot recover; swelling head and throat. 20th August, 1888.—Discharged died at 7 a.m.

Post-mortem.—Anthracoid tumours around the throat and other *post-mortem* appearances; special seat of lesions, chest.

Case XXV.

Subject.—Bay Persian gelding, aged ten years. F 14, 19th August, 1888—Anthrax. Admitted at 6 a.m. Temperature 104·3, pulse 42; mucous membranes injected; refuses food. This horse stands next to F 12, one which has died of Anthrax. Gave Sodæ Bicarb. Hyposulph. 6 p.m.—Much the same; temperature 104·2; medicine repeated. 20th August, 1888.—Temperature 103·6, pulse 46; appears much the same; medicine repeated. 6 p.m.—Temperature 103·3, pulse 50; treatment continued. 21st August, 1888.—Temperature, 102·3; much the same; eating little. 6 p.m.—Temperature 105·2, pulse 60; swelling suddenly appeared round the head and throat; will not recover; sudden change for the worse. 22nd August, 1888.—Discharged died at 5.30 a.m.

Post-mortem.—Intestinal Anthrax.—Spleen weighing 9½ lbs., rough sketch of which is enclosed.

Case XXVI.

Subject.—A grey Persian entire, aged eleven years. B 61, 19th August, 1888.—Anthrax. Admitted at 1 p.m. Temperature 105,

pulse 46; dull; showing similar symptoms to the others, moving head up and down; nostrils dilated; gave Ammon. Carb. 2 drs., Sodæ Hyposulph. 2 drs., swelling round the throat. 6 p.m.—Temperature 104·3; swelling increased; Tinct. Aconite, Sodæ Hyposulph. 20th August, 1888.—Temperature 105, pulse 48; no improvement; appears much the same; gave Acid Carb., Tinct. Aconite. 6 p.m.—Temperature 105, pulse 50; no improvement; green discharge from off nostril; uneasy; Colic pains; eating little; treatment continued. 21st August, 1888.—Patient much worse; temperature 105, pulse 50; pharyngeal region much swollen; discharge from both nostrils profuse; and mixed with yellow serosity; difficulty in drinking water; medicine repeated. 6 p.m.—Temperature 105·3, pulse 56. 22nd August, 1888, 7 a.m. —Temperature 104, pulse 54; much the same. 6 p.m.—Temperature 104, pulse 52; medicine repeated three times in the day. 23rd August, 1888, 7 a.m.—Temperature 103·1, pulse 48; appears distressed, heaving at flanks; discharge continues free from both nostrils; medicine continued; difficulty in drinking; eats lucerne, but quids it. 6 p.m.—Temperature 104·1. 24th August, 1888, 7 a.m.—Temperature 101; still sore throat and difficulty in eating; quids; discharge free; steaming the head. 6 p.m.—Temperature 104; may recover. 25th August, 1888.—Temperature 101·3; doing well; Sodæ Bicarb. 6 p.m.—103. 26th August, 1888, 7.30 a.m.—Temperature 101. 6 p.m.—Temperature 102. 27th August, 1888.—Temperature 101·1; doing well; discharge ceased; loss of condition; staring coat; temperature 101·3; pulse 48 at 6 p.m. 28th August, 1888.—Temperature 101, pulse 38. 5 p.m.—Temperature 101·4; doing well; pulse 43. 29th August, 1888.—Temperature 101·1, pulse 36. 30th.—Temperature 101. 31st.—Temperature 100·4. 1st September.—99·3. 2nd September.—100·1. 3rd September.—99·3. 10th September, 1888.—Discharged cured.

Case XXVII.

Subject.—A grey Persian entire, aged eleven years. B 56, 26th August, 1888.—Anthrax.—Admitted at 6.15 p.m. Dull; refusing food; mucous membrane injected; temperature 106·1, pulse 62; blowing hard, and shows similar symptoms to the other cases. Gave Tinct. Aconite 20 min., Sodæ Bicarb. 4 drs., Hyposulph. 2 drs. in bolus. 27th August, 1888.—Appears somewhat better; no swellings; still dull; eating little lucerne; grunts and is coughing. Ball repeated at 7 a.m. and 2 p.m. 7 a.m.—Temperature 105·1, pulse 50. 6 p.m.—Temperature 106·1, pulse 58. 28th August, 1888.—Temperature 105·3, pulse 54; Pot. Nit. 2 drs.,

Gentian Pulv. 2 drs., Sodæ Hyposulph. 2 drs.; repeated at 12 a.m. 6 p.m.—Temperature 105·1, pulse 54. 29th August, 1888.—Temperature 103·3, pulse 54; medicine continued; doing well. 30th August, 1888.—Temperature 102·3; discharge slight from off nostril. 31st August, 1888.—Coughing; temperature 101·1; discharge free; medicine continued; doing well. 1st September, 1888.—Temperature 102·3; horse appears worse; medicine repeated in the afternoon; the temperature decreased again to 101·1. 3rd September, 1888.—Temperature 101·1; improvement; no further treatment considered necessary; eating regular food. 4th September, 1888.—Temperature 102·2. 5th.—101. 6 p.m. 102. 6th September.—101·1. 6 p.m. 102. 7th September.—100·4; doing well. 10th September, 1888.—Discharged cured.

Case XXVIII.

Subject.—Bay Persian gelding entire, aged twelve years. F 30, 29th August, 1888.—Anthrax. This horse was proposed for casting, and the board was ordered to assemble upon the day after the outbreak of Anthrax in the regiment. So being useless, he was isolated from F Troop, which had not exhibited any signs of Anthrax up to date, and was fed once upon the suspected grass of B Troop. Clinical observations were made on the evening of the 16th August, and nothing abnormal was detected. However, on the morning of the 17th instant he was quite unable to rise. Temperature 103·2; refusing food, and when lifted up he appeared dull and was breathing hard. The horse always before this had been a greedy feeder; he was then removed to the Anthrax camp, but some distance away from the others, so that he could not gain the contagion by being placed near the others. Clinical records were kept of his temperature as follows:—18th, 104; 19th, 103; 20th, 103·1; 21st, 103; 22nd, 102; 24th, 105·2; 25th, 104·1; 26th, 103·3; 27th, 103·1; 28th, 102·2; 6 p.m., 103; 29th, 7 a.m., 103·2; 6 p.m., 104. 30th.—Discharged died.

Post-mortem.—Similar to other cases of Intestinal Anthrax, and he had abscesses in the pelvis of both kidneys.

Remarks.—In bringing this report to a conclusion, I have to consider the following:—

Firstly.—The nature and character of the outbreak.

Secondly.—Causes or mode of access of the poison.

Thirdly.—Mortality, loss, and recoveries.

Fourthly.—Precautionary and suppressive measures.

Fifthly.—Disinfection, cremation, and disposal of dead.

Sixthly.—Breed and sex.

Lastly.—Treatment adopted.

This outbreak was characterised by the rapid manner in which it showed itself, the number of days over which it lasted, and its sudden disappearance. I have now to consider the cause of the outbreak, and seeing that Anthrax arises either from telluric influence, or from the subject coming in contact with the contagion, by means of his food or some other source, the following questions may be asked:—(*a*) Was the disease due to atmospheric influences? To this may be said "No," although a previous outbreak arose in a similar month of the year and a nearly corresponding date of the month; besides, had this been the cause, the disease would have appeared in more divided portions of the regiment, instead of being confined almost to one troop. I admit the stables in which the disease appeared were both of a nature and inferior to the iron corrugated roofed ones; but I consider the floors, walling, and other stable furniture to be equally good and clean. (*b*) Did the cause exist in the forage that had been supplied to the horses? To answer this I must necessarily sub-divide the question into groups:—(1) Was it due to the grain? No; because this supply had been a continuous one, and from a similar stock for at least a month previously, saying nothing of the fact that the same grain was issued to every horse in the regiment, and that the disease was confined to certain troops. (2) Was the supply of bran to blame? To this I cannot attribute the cause, because the issue to all the horses in the regiment was alike and drawn from a common source. (3) Can dry grass be held responsible? Certainly not; for the issue of dry grass or hay had been from one rick for quite two months previously, and had been issued to the whole regiment. (4) Was the water-supply in any way contaminated? To this one may safely say "No," seeing that B and F Troops, in which the disease appeared, each watered in company with three other troops at entirely different wells, yet the disease did not appear in any of the other troops. I have also examined the quality of the water in the wells, and find that neither are contaminated. No. 7 well contains nine grains of chlorine per gallon, whilst No. 9 well contains ·65 grains of chlorine per gallon. This places them both in the testable scale, and as such water would not be considered unfit for the use of men, so it would be safe for horses. (5) If the cause exists in none of the foregoing, is it not probable that the supply of green grass has done something to account for the outbreak? In support of this view, I beg to state that Anthrax Fever has been most prevalent of late in all the villages round cantonments, a number of cattle dying from it in each. No sanitary measures are adopted by the natives towards the disposal of the dead animals, but they are

allowed to waste and decay, and to be devoured by jackals, etc.; generally the half-dead animal is led or hauled to the nullah or river before dying, this being the only measure the native adopts to dispose of dead animals. It is a well-known fact that the regimental grass-cutter, when in search of grass, goes to all the nullahs and streams, where suddenly he comes upon a luxuriant crop and at once proceeds to make his day's work without any selection, and takes his hasty burden into camp, only to be passed together with the remainder of the supply. When the outbreak arose, I suspected the hariala from its nature and condition to be a likely cause of the disease, so at once proceeded to test my opinion, and luckily I had an excellent opportunity of proving it, thus enabling me to find out the real cause, and prevent the disease spreading, and producing considerably more damage. Troop horse F 30, which was to be cast as worn-out and useless, was selected for the experiment; clinical observations were taken on August 16th, the day of the outbreak, at 3.30 p.m., and nothing abnormal was detected; after this a fair feed of the suspected B Troop hariala was given to the subject, and he partook freely of it, with the result that on the following morning he was unable to rise—a symptom he had never previously shown. He had a greatly increased temperature, and from further reference to this case it will be seen that the horse succumbed to Anthrax Fever, accompanied by other complications, upon the 30th instant; no treatment was offered in this case, and he was entirely isolated from the others, and only had one feed of the grass. This I consider plainly proves the cause of the outbreak.

Mortality.—Twenty-eight cases of Anthrax were admitted into hospital, of which number twenty died and eight recovered. All precautionary measures, as will be seen from the report, were taken to prevent the spread of the disease, disinfection being thoroughly carried out, while special attention was bestowed upon the line gear, clothing, and syces.

Cremation.—All horses that died from Anthrax were burnt in the field cinerator with the Government allowance of fuel, which was sufficient. The ground of the field hospital has been well lined, and will now be ploughed up and allowed to remain a fallow, if possible. The stables and standings have been treated according to rules laid down in such cases.

Breed and sex.—The breed and sex of the twenty cases that died were as follows:—Persians eighteen, Australians two, entires twelve, geldings seven, mare one. The eight cases that recovered were all Persians, six of them being geldings and two entires. The percentage of recoveries is greatly in favour of the

gelding; and I noticed in almost every case the geldings withstood the disease longer than the entire.

Treatment.—The treatment adopted by me in the Anthrax cases has varied somewhat. At first I was of opinion that aperients were beneficial, seeing that as soon as the bowels responded freely some slight signs of recovery were exhibited; but unfortunately during the outbreak we had to encounter heavy rain, which must have had a detrimental effect upon some of the cases in which aperients had been administered. Magn. Sulph., Chlor. Hydrate, and Acid Carb., I tried, but with singular failure; at the same time distinct recoveries favoured me with the following treatment: Sodæ Hyposulph., Sodæ Bicarb., and Tinct. Aconite, which was given in bolus every three hours, the ordinary dose being doubled upon each occasion. I consider the Sodæ Hyposulph. treatment quite the most beneficial yet tried in Anthrax, as appreciable and most apparent results were obtained with its use. I also consider the Sodæ Bicarb. an excellent thing in combination, but both must be given in large doses when intestinal symptoms are present. I have found nothing to compare with Tinct. Aconite in double doses. I have tried Carbonate of Soda, but did not notice any good results therefrom. I found that in cases of difficult breathing, sufficient to cause the performance of tracheotomy, only temporary relief was afforded, and the patient generally died a few hours after the operation. In acute and aggravated cases there was always an inclination to feed up to the last. The horses that have recovered from Anthrax are very much reduced in condition, and they show a general unthrifty appearance, although their ration has been increased. Upon the 16th instant, B and F Troops were both returned nearer to their lines and located one upon the west and the other upon the east side of the cavalry stables; no fresh case has arisen since the 26th ultimo, excepting F 30, so I now consider the outbreak to be at an end, and the horses will be returned to their respective lines as soon as the necessary disinfections and alterations have been carried out.

Remarks.—In the foregoing report I have endeavoured to furnish as minute details of the outbreak as I consider worth recording; at the same time I must admit I could have more fully and theoretically arranged the cases, but I have taken them in as ready a manner as possible, and I trust that the report will be found, as I intend it should be, merely a rough outline of the outbreak with true records as kept up daily in the Record of Treatment Book.

Editorial.

THE INTERNATIONAL VETERINARY CONGRESS OF 1889.

The International Congress, which has been frequently announced in this Journal as arranged to be held in Paris this year, met on September 2nd, and continued its sittings until the 7th. The meetings were held at the fine and commodious rooms of the French Geographical Society, and took place morning and afternoon every day during the week, except on the 4th, which was devoted to the inauguration of the statue to the late Professor Bouley. The attendance, though considerable, was perhaps not so large as at the Congress at Brussels in 1883, owing, doubtless, to the total absence of representatives from Germany. Most of the other European countries were represented by men well known to medical and veterinary science, and to those from beyond the boundaries of France their French brethren gave a courteous reception and in most cases a hearty and hospitable welcome. The arrangements for the Congress appeared to be complete in every way, the French faculty for organisation being put strongly in evidence throughout the week. Dr. Chauveau was elected president, Nocard secretary, and the other office-bearers were selected from the members. Representatives from other countries were officially received, and Dr. Fleming, who, with Messrs. A. Robinson (Greenock) and H. Young (Brighton), attended from this country, was accepted as the representative of the profession in England.

The discussions on the various important subjects brought forward, and which will be noticed in next month's Journal, were admirably conducted, the President showing great tact and judgment in leading them to a useful conclusion, the respect and esteem in which he is universally held materially aiding in procuring this result.

One of the most interesting events of the meeting was the exhibition, by Professor Arloing, of the microbe of contagious Pleuro-pneumonia. That it is the veritable cause of the disease Arloing has absolutely proved by repeated experiments, in which he has produced the specific lung lesions by introducing it into the blood after successive cultivations. This promises to be a discovery of great value.

Another interesting event was the inauguration of the Bouley statue at the Alfort Veterinary School. This ceremony was conducted in a most impressive and brilliant manner, in the presence of a large assemblage of professional men and representatives of different branches of science. A large tribune had been erected in front of the statue, on which were seated the foreign and other Congress-men. The Minister of Agriculture honoured the ceremony with his presence, and speeches were delivered by him, by Dr. Chauveau (who received well-deserved praise for his eloquent discourse), by Nocard and Leblanc, and by Professor Degive (Brussels) on behalf of the foreign representa-

tives. The proceedings were enlivened by a military band, and by the attendance of the army veterinary surgeons in Paris and neighbourhood, *en grande tenue.* The statue is a beautiful work of art, and a striking likeness of the venerated Bouley.

On the evening of the last day of the Congress the French veterinary surgeons entertained their foreign colleagues at a banquet on the first floor of the Eiffel Tower, at which everything was said and done to testify that veterinary science is best promoted by the cultivation of sentiments of mutual respect and confraternity among its devotees.

The next Congress is to be held in Switzerland in four years.

RABIES IN SCANDINAVIA.

In the discussion which has arisen as to the desirability of adopting measures for the extinction of Rabies in the United Kingdom, the efficacy of the measures proposed by those who, it may be presumed, are in the best position to judge, has been doubted by those who are in favour of allowing things to remain as they have been and are; while the extent to which sanitary legislation in other countries has been successful, has either been ignored or misrepresented. Among other countries, Scandinavia has been mentioned as one in which suppressive measures have been most successfully employed, and by the opponents of these measures as one which is still visited by the disease. In order to settle the question, so far as that part of the world is concerned, we placed ourselves in communication with Professor Lindquist, of the Stockholm Veterinary School, and editor of the Swedish *Veterinary Journal*, who courteously writes to the following effect: "For the last ten years (1879 to 1888), the history of Rabies Canina in Sweden has been as follows:—1879. In Gothenburg one dog was affected, and in the Northern parts of Sweden (Lapland), nine dogs, one sheep, one cat, and two people were reported as attacked by it; 1880-81, no cases; 1882, three cases suspected; 1883-85, no cases; 1886, the disease appeared through a dog imported from St. Petersburgh; 1887-88, no cases. The importation of dogs from countries in which Rabies prevail is forbidden. When the disease appears in Sweden, rabid dogs and animals bitten by them are killed; and in a radius of ten kilometres from the place where the malady occurs, muzzling of all dogs is enforced for a period of 120 days after the last case. With regard to suspected animals that had bitten any person, the same regulations are carried out as are laid down in your remarkable work, 'Rabies and Hydrophobia.'"

ON THE DISEASES OF THE URINARY AND GENERATIVE ORGANS.

BY A. E. MACGILLIVRAY, M.R.C.V.S., BANFF, N.B.

(*Continued from page* 200.)

I don't think I need linger longer discussing the diseases of the generative organs in the lower animals, so I will pass on to the consideration of the various abnormalities observed in connection with the urinary system. The foundation of this system may be said to be the kidneys, and they are subject to a variety of diseases, such as Inflammation, Abscess, Tubercle, Atrophy, Hypertrophy, Calculus, etc.

Inflammation of the kidneys may be of different kinds, acute, chronic, tubercular; acute and chronic Nephritis may also be either traumatic or

idiopathic, so to speak; and as a rule the idiopathic form is the more dangerous and followed by the most serious and lingering sequelæ; it is scarcely necessary here to fully detail the symptoms of acute Nephritis, suffice it to say that it may be confounded with simple Gastralgia or even Peritonitis or Enteritis, and great care must be taken not to do so, as the treatment for these affections requires to be so very different. Nephritis is generally caused by irritation, either external or internal; the former may be the result of injury or of continued exposure to wet and cold, and the latter from faulty food or water, and even from sympathy during an attack of Peritonitis. I have also seen a very startling form of anthracoid apoplectic Nephritis, in which the kidney or kidneys were literally engorged with disintegrated blood, of a black, tarry and non-coagulable nature. Anthracoid inflammation, if the term may be allowed, of any organ is a study or problem never yet explicitly or satisfactorily worked out; it is all very good saying that a certain *bacillus* is the root and stem of this Anthrax; but how is it generally so very quickly fatal? and how does it give rise to so much extraordinary disturbance in so short a time?

Returning to our immediate subject, however, Nephritis being the disease and the character of the same having been settled, the treatment which I adopt energetically palliative and antagonistic; I remove the cause if possible, I administer sedatives and antacids, and I apply across the loins either sinapisms or sheep skins: in addition I alter and carefully regulate the diet: very heroic treatment I find obnoxious to Nephritis in general, so I never either bleed or give strong purgatives: if the latter is done in ignorance, as will happen, the effects are simply fatal.

Hypertrophy, Atrophy, or Abscess may follow Nephritis, and in either case the secretion of urine becomes abnormal; careful examination of the urine in such cases will therefore enable us to come to a decision as to what has actually taken place in the kidneys or kidney, for I have generally found only one affected during *post-mortems*.

I have very little experience of kidney *calculus;* but the reverse as regards *Tubercle*, which I have found pretty often in cattle, pigs, poultry and rabbits.

Inflammation of the *ureters* is not at all infrequent in young calves and lambs, and is almost always fatal, the ureters getting completely blocked, and thus preventing the absolutely necessary descent of the urine to the bladder; *uræmia* often closes the scene.

Having arrived at the *bladder*, we find that a great many very interesting abnormalities may be presented for consideration in connection with that important viscus. We have acute and chronic inflammation—with or without Catarrh; Atrophy and Hypertrophy—either of walls or general bulk; Paralysis—either idiopathic or sympathetic; malignant or benign tumours—usually the former; several forms of deposits and various calculi; rupture. The list might be augmented; but, as it is, an extensive treatise might be written on the subject.

Cystitis in the lower animals is more common than might at first sight be supposed, this is easily accounted for by the want of close observation and the meagre and non-restrictive character of the symptoms, which latter are analogous to those produced by tumours or calculi in that organ (bladder), and the discharges found during Urethritis and Prostatitis, or even Vaginitis. As a matter of course manual exploration will settle the doubt as to tumours and calculi; and generally the amount of mucus passed during the earlier stages of Cystitis is mostly conclusive; on the other hand we have more pain during micturition in Urethritis; and more difficulty in, if not total stoppage of, urination during Prostatitis; while examination with or without a speculum will settle the difficulty as to Vaginitis.

Cystitis may be either acute or chronic, sympathetic, traumatic, or idio-

pathic; but, of whatever character, it is almost always caused by irritation of a more or less direct nature: as a preliminary to treatment we must therefore endeavour to remove that irritation; having done so I generally give an oleaginous laxative in combination with a sedative, followed by antacids; and, if improvement is not soon observed, I adopt very mild injections of either copper or zinc sulphate and some preparation of opium: I may, however, remark that these injections must be very carefully considered and very cautiously applied; as it requires but an astonishingly small amount of irritation to do mischief in a case of Cystitis: the irritation caused by interference may bring on spasm at neck of bladder and complete retention of urine to such an extent as to cause rupture of the inflamed and tender viscus; I have seen this happen more than once.

Atrophy and Hypertrophy, as I have said, may be restricted to the walls of the bladder or to the general bulk of that organ; or the two abnormalities may be concomitant, as, for example, in two cases which I have met with (*post-mortem*) where the fundus was immensely hypertrophied—a solid thickness—while the general bulk of the rest of the bladder was reduced at least two-thirds: in both these cases during life there was incontinence—owing to injuries received by the urethra and sphincter vesicæ during erratic coition. Atrophy and Hypertrophy are commonly induced by some other cystic or urinary abnormality or injury: treatment is useless.

Vesical tumours of various sorts are by no means infrequent in the lower animals, and give rise to much irritation and serious Cystorrhœa, which may be mistaken for the catarrh often present during, or resulting from, Cystitis: microscopic examination and rectal or vaginal exploration ought to definitely settle which of the two is the origin of the "flow." As a rule the discharge from vesical tumours is far more repugnant, both in appearance and smell, than the catarrh of or from Cystitis—but exploration is most decisive for diagnosis: I have at times met very extensive cystic tumours, in young stock, which broke up and were discharged in most abominably smelling shreds; generally these cases don't do well—especially in males. It may be set down as a rule that genuine cystic tumour in the lower animals, of whatever sort, is amenable to little or no treatment, either curative or palliative; I shall not therefore further enter into the subject, as, to the veterinarian, it is only valuable diagnostically.

We will now consider the *deposits* and *calculi* found in the bladder; as a matter of course there are several sorts of deposits, and various calculi, and a correct diagnosis in regard to the same is of the utmost importance alike to the practitioner, owner, and patient. There are no doubt certain extraneous symptoms indicative of the presence of vesical deposit or calculus, but these resemble so much the symptoms present in Cystitis, Urethritis, and Prostatitis, etc., that I have always maintained the necessity and infallibility of exploration either by hand in rectum or vagina, or by sound *per urethram*, or the two in combination. Having satisfactorily settled the presence and character of the deposit or calculus, the next consideration is the removal of the same, and this, in veterinary practice, is always a very serious matter—more especially in horses.

In discussing the removal of calculi I think it will be better to embrace urethral as well as cystic, the one being as it were the sequel of the other. I have removed calculi from the mare, ox, and dog, but never from the horse. The late Professor Dick used to explain and demonstrate a very elaborate and complicated *modus operandi* for the removal of cystic calculi in the horse, which, if called upon to operate, I would never think of adopting; I would rather go in for the mode recommended by Principal Williams in his *Surgery*, namely, cutting at once boldly down into the urethra and making an incision large enough to admit the necessary size of forceps.

In the mare instead of a forceps I used a sort of double crotchet, the two arms of which met at the end of the turned round hook or crook; having introduced this *per urethram* I manipulated *per vaginam* until I got the calculus firmly lodged in the "hook or crook" of the crotchet, where I retained it in position by my right hand in the vagina, and putting considerable traction on the crotchet thus extracted the offending calculus! In one case it required two assistants on the crotchet to pull away the calculus, and yet the mare made a splendid recovery. The latter "stone" weighed close on seven ounces. The after treatment consisted of the careful application of carbolised olive oil—1 in 16—to the injured parts of and about the urethra, and, as mentioned, recovery was speedy and complete.

In the ox the calculi generally escape from the bladder into the urethra, and being very small are often very difficult to discover, but *if felt* should at once be cut down upon and removed, a proceeding which causes very little annoyance and gives immediate relief. I either stitch or pin up the wound, and in general adopt no other after treatment.

I cannot leave this part of my subject without again remarking how difficult it often is to discover the obstructing "stone" in bovines, more especially if the patient is fat. I had recently a case in a two-year-old ox where I was certain there was a calculus present *in urethram*, but failing to fix on its *locale* I did not operate. On post-mortem examination I found no less than three calculi lodged in the urethra at different places between the peculiar curvature of the bovine penis and the bladder, which viscus was ruptured. As this ox was in prime condition I advised his slaughter, but the owner would not consent.

In the dog the position of the calculus can generally be discovered by the introduction of the catheter or sound; and, as canine calculi are commonly small and their presence only suspected or known on their escape from bladder into the urethra, their removal is accomplished by cutting down into the urethra, as in cattle, which as already mentioned I have successfully accomplished. As a matter of course calculi are at times discovered in the canine bladder; but I have never operated for their removal, so I cannot discuss the subject.

Urinary deposits of all sorts owe their origin either to a faulty state of the system or to improper feeding, and the former cause may depend upon or succeed the latter. In so far as my experience goes the most dangerous form of deposit is that vulgarly known as "sand," and often it is most beautiful "lily-white sand!" Quite recently two very interesting cases of this kind in two prize-taking two-year-old oxen came under my notice; they were both very heavy animals and were both bred and brought up on the same farm, and were sold when rising two years old. Some months after their sale they were attacked at intervals with "gravelly pains," generally during urination, were treated with oleaginous purges and sedatives, which relieved them once or twice at first; but attacks becoming more frequent and more severe, examination of the urine, and the hair at point of sheath, revealed the existence of very numerous pure white crystals or "sand." On observing this I advised the slaughter of the ox under my care, and on *post-mortem* found the bladder fully half-filled with these beautiful crystals or "sand," the urethra was also nearly blocked with them along its whole course. I believe the other ox was affected in exactly the same way, and some operation was attempted for the removal of the deposit, but unfortunately proved unsuccessful.

Sabulous and other somewhat similar deposits, in bladder or other parts of urinary tract, may be got rid of by the judicious use of various acids, and diuretics, in accordance with the nature of the deposit; it is, however, impossible here to enter fully into this part of our subject.

The same remark must be made when we come to consider *the abnormalities observable in urine;* this part of our subject is of sufficient importance and interest to occupy our whole space, but must be merely glanced at. We have simple Diabetes or Polyuria, saccharine and albuminous Diabetes, Azoturia or Hæmoglobinuria, Hæmaturia, red and black water, etc. The most of these abnormalities generally originate in defective nutrition, or improper dietary; it is astonishing how easily Diabetes may be induced by an irregular, bad, and improper diet. It cannot be denied, however, that these diseased conditions of urine may be the result of other causes, such as undue exposure to cold or wet or the two combined; or may occur as the sequelæ to other debilitating affections; or may accompany or be caused by some organic lesion in some of the principal parts of the body. From whatever source they come, however, they must be pretty smartly looked after, and of one thing we may be certain, namely, that there is no "royal road" to their removal! True, there is one exception in the remarkable efficiency of *iodine* for the almost instantaneous eradication of Diabetes insipidus. In using iodine as an anti-diabetic I prefer giving one or two large doses, each containing one dram or more of pure iodine, instead of several small doses; and I believe this is generally the plan adopted.

As a preliminary to the successful treatment of any of these urinary irregularities we must find out and remove the cause, otherwise our efforts are useless. The food and water supply must be looked to, corrected, regulated, and, if necessary, completely altered. A great deal depends upon our thorough attention to these points which, if neglected, will render our prescriptions of very little avail, as the latter are merely adjuncts of the former. It is not in my power, within the bounds of this paper, to enter into the various lines of treatment necessary to contradict or remove these urinary abnormalities; suffice it to say that, in addition to the hygienic investigations and corrections we must apply various tests to the urine in order to correctly know what is actually wrong with that secretion or excretion, and, having ascertained that, we may then proceed to treat accordingly.

In Azoturia or Hæmoglobinuria I find the chief thing to be a pretty smart purgative; in the very worst cases, where the patient goes down and may be unable to rise for two or three days, I find the exhibition of from *eight* to *ten* drams of aloes all that is necessary, the animal getting on to its legs again as soon as purge operates freely.

With the tests for abnormalities in urine I need not interfere, as they are, so to speak, classical and now well known to every tyro in our profession.

In concluding this paper I may remark, as I did at the commencement, that I have strictly eschewed all routine or class-book style of writing, and stuck firmly to my own experience—given in my own words and style; for which, if found unsatisfactory or crude, I crave the kind indulgence of my readers.

INFECTIOUS MAMMITIS IN THE COW.

Lucet, veterinary surgeon at Courtenay, France, publishes an interesting article on "Infectious Mammitis in the Cow" in the *Recueil de Méd. Veterinaire* for July, which deserves notice; and especially because, as he remarks, inflammation of the mammæ in this animal, so varied and frequent, and so important with regard to lactation, tends more and more to be included among the infectious diseases. Of late years several observers, applying to study of the causes and pathology of this affection microscopical investigation, and more particularly micro-biological research, have suspected this infectious origin, and have even discovered the virulent agent in certain cases.

In 1875 Rivolta studied a Mammitis affecting goats in the neighbourhood of Pisa, and to which he gave the designation of Septic Mammitis, because of the lesions observed. About the same time L. Franck, as the result of some experiments, did not hesitate to regard as the principal, if not the sole cause of Mammitis, infection occurring through the introduction of bacteria into the udder by the canal in the teat. During ten years no further advance was made; but in 1884-5 Mollereau and Nocard studied in a complete manner a chronic Mastitis of cows which was very contagious, as it attacked nearly all the animals in a byre, and they proved by inoculation that the micro-organism found in the milk of the diseased cows was really the unique cause of the malady.

This form of Mammitis has since been observed in Switzerland by Hesse and Borgeand, of Berne; in Italy by Feletti, of Aosta; and in Denmark by Prof. Baug, of Copenhagen. In 1885 M. Mathis, in a paper on Parenchymatous Mammitis (*Journal de Medecine Veterinaire et de Zootechnie*, 1885), says: "In *resumé*, the Mammitis known to veterinarians by the name of Parenchymatous Mammitis consists not in an inflammation of the glandular acini, but rather in an inflammation of the connective tissue which separates them, and which is characterised by more particularly involving the lymphatic system. This latter consideration might lead to the view that this is an infectious malady."

In 1887 Nocard again proved by inoculation that the micrococcus found in the milk of ewes affected with Gangrenous Mammitis is really the cause of the affection.

Lastly, Kitt, of Munich, in a paper which appeared in the *Deutsche Zeitschrift fur Thiermedicin und Vergleichende Pathologie* for August, 1885, gives a very interesting description of the disorders affecting the mammæ of the domesticated animals, in which, ascribing these inflammations largely in their origin to infection, he establishes the following divisions:—

Hæmatogenous Mammitis, when the infecting agent is derived from the blood;

Galactogenous Mammitis, when it is carried by the galactophorous vessels;

Lymphogenous Mammitis, when infection is conveyed by the lymphatic vessels.

In this communication Kitt not only publishes the result of inoculation of milch cows, the virulent material having excited experimental Mammitis, but also shows that he has studied in a complete manner acute Parenchymatous Mammitis. He evidently proves, by cultures and inoculations, the parasitic nature of the malady, and, following out the idea of Franck, he admits that infection is brought about through the introduction into the gland, by means of the teat, and through the agency of drops of milk adhering to that part after milking, of various microbes derived from putrid matters (manure, putrefied fluids), and that this purulent Galactogenous Mammitis is sometimes caused by one micro-organism, sometimes by another, or even by several at once.

The observations furnished by Lucet, and which were founded on cases as they occurred in his practice, show in a remarkable way how well established this theory is. One striking fact was noted in all these cases, and that was the constant presence in the milk, or rather in the fluid drawn from the diseased gland, of a microbe, varied in character in each of the forms of Mammitis, this organism being found throughout the course of the malady.

Whether inoculation of the cow with milk or cultures had not been made, or had been unsuccessfully practised, it was nevertheless the case that in the affected part of the udder there was found a micro-organism which, if it was not specific, nevertheless determined by its presence, or by the fermentations it set up, very marked inflammatory symptoms and lesions which might cause death.

This infectious origin wonderfully explains the sudden appearance of the malady; in fact, the microbes finding in the lactiferous reservoirs of the cow a perfect culture-medium and a constant temperature, we can understand why, in a few hours—from one milking to another—occur those voluminous swellings which so terrify the cattle-owners, and which in France are generally called an Anthrax. In this way also can be explained the diversified forms which Mammitis may assume—forms which may be ranged in a certain number of groups, according to the micro-organisms which produce them, and which appear to be as varied as the lesions observed.

This origin, finally, explains why Mammitis is most frequently located in the posterior quarter of the udder, as by reason of its position it is more readily soiled by the dung during decubitus; and also affords a reason why treatment is so often of little avail in combating the disease.

Lucet describes eight cases, and from them arrives at the following conclusions:—Beyond congestion of the mammæ, always invading the whole of the organ, and which occurs some days before or after parturition, only appearing in primiparæ or very good milkers, not serious in the majority of cases, and readily yielding to antiphlogistic treatment, there is not in cattle anything other than infectious mammites, which differ in their forms and gravity according to the nature of the infecting agent; and their treatment should principally consist in injections of disinfecting fluids, passed either into the teat or into the tissue of the diseased part of the gland.

FORAGE FOR MILITARY PURPOSES.*

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I AM not aware that the subject of forage for military purposes has yet been brought before the members of this Institution for consideration and discussion; and yet it is one which, from several points of view, certainly deserves notice, especially from those who have to provide for the wants of mounted corps, whether during peace or in the field, as well as the Officers of these corps. While in quarters the subject may not seem of any moment, and particularly if the forage is abundant and of good quality; for then it is provided by the contractor in the usual manner, and, if it meets with the requirements of the contract, no further heed may be given to it. But if it is of indifferent quality, or the contractor is not moved by conscientious scruples, either as to quantity or quality, then the case is different; and only those Officers who have had long experience of forage and forage inspections know what vigilance and care are demanded in guarding against deception, and consequent injury to their horses, either from deficient quantity or improper quality.

The supply of forage in the field is always of importance, sometimes urgently so, and it is to this supply that I shall mainly allude in the brief space of time allowed me. For if it be true that the hay and corn market is not so expensive as the horse market in peace-time, then it must be accepted as still more true during war, when horses are so necessary, so difficult to replace, and when so much depends upon their being maintained in the highest state of efficiency. At all times it must be recognised that bad food makes bad horses, and insufficient food produces weakly ones; and while at any time bad or weakly horses are undesirable, on active service they are most objectionable in every way.

* A lecture delivered at the Royal United Service Institution, Lt.-General Sir Beauchamp Walker, K.C.B., in the chair.

In considering the subject of forage for military purposes, I purpose, with your permission, to deal with it under the following heads, and chiefly with a view to the requirements of field service: 1st, Different kinds of forage; 2nd, Concentrated; 3rd, Compressed forage.

1. *Different kinds of Forage.*—The usual food of horses in this country, and over the greater part of Europe, is oats and hay, with sometimes a certain proportion of straw. In some parts of Spain, as well as in North Africa and Asia Minor, the grain given is usually barley, with chopped or broken straw. In South Africa and America, maize is largely used, with hay and straw. In India, gram and cooltee are the principal grains, and freshly gathered grass is chiefly used instead of hay and straw.

For the present we will consider oats, hay, and straw as constituting the classical forage rations of army horses in Europe; other articles being substituted only in special circumstances, when the supply of these is too expensive, inadequate, or altogether fails. It must be remarked, however, in speaking of these substitutes, and especially with regard to grain, that they can rarely be resorted to suddenly. The horse appears to be peculiarly impressionable to abrupt changes from one kind of food to another—more so, perhaps, than any other of the domesticated animals; and this must be seriously taken into account in considering the question of forage for army use. This impressionability is related not only to the horse's physiological constitution, but also to his natural fastidiousness and delicacy of taste. He requires a long time to become reconciled to some kinds of food, no matter how suited they may be to his organization; and when a strange forage is put before a number of horses, it is curious to note the different ways in which individuals will take to it. Some will eat it without hesitation, others after a day or two, others will eat it sparingly and never take to it kindly; while some others, again, will not even try it, and will sink from hunger exhaustion with the food lying before them.

Physiologically, sudden changes from one forage to another are often productive of very serious consequences, and many instances of grave damage to troop horses from this cause might be mentioned. I need, however, only allude to the great mortality which occurred among the horses of our mounted corps, immediately after the Battle of Waterloo, when the Allied Armies were advancing on Paris, due to the horses being fed chiefly on growing wheat, for lack of other forage; and to the heavy damage done to our army horses in the Crimea, when they were given barley instead of oats, the supply of the latter having failed. Injury of this kind is more or less related to the digestibility of the food, a matter of importance in regard to this subject.

In Oats we have, undoubtedly, the best of all the grain foods for horses, as they contain, in a concentrated form, all the elements necessary for supplying waste of tissue, and especially that of the muscles; while they are, as a rule, easily digested. For horses performing hard work, there is no grain equal to them, though it must be admitted that horses can undergo severe exertion on other kinds of grain, such as barley and maize.

The nutritive value of oats is about equal to that of hay, though owing to their more ready digestibility and relatively small bulk, they are preferable to it when time, transport, and capacity are of moment. And besides their value as an aliment, it would appear that oats contain that which has not yet been found in any grain food given to horses, in the form of a stimulating principle which, acting upon the nervous system of horses, gives them more energy and stamina while developing their muscular powers, and has altogether a favourable influence on their condition when they are taxed by work. M. Sanson has discovered this principle in the husk, and having isolated it, has experimented with it upon horses. To this may be attributed the superiority of oats over barley, maize, and other grain, in sustaining

horses for long periods of severe exertion, when stimulation, as well as pabulum, is needed.

In judging of oats for food, it is well to remember the characters by which good may be differentiated from bad oats. In the first place, each grain consists of two parts, husk and kernel, the latter possessing considerable alimentary value, and the former scarcely any at all; so that oats which contain the largest proportion of kernel are those which are most serviceable to the horse. The relative proportions of kernel and husk vary considerably in different kinds of oats; in some samples the husk forms as much as 35 and 40 per cent. of the oats, while in good grain it may be as low as 20 per cent. It is of importance sometimes to estimate the feeding value of oats, and this can readily be done by separating the kernel from the husk by hand in a number of seeds, and weighing each. This gives a better and a more practical indication than is afforded by the external appearance of the oats, their colour, or their weight collectively. It may be noted that oats which have the smallest proportion of husk are those which are most readily and thoroughly digested, and that crushed oats are more quickly and perfectly digested than when they are whole.

The weight of oats is not altogether a trustworthy index to their nutritive value, though it is that which is generally adopted; the thickness of husk and its separation from the kernel, as well as the dryness of the grain, will influence its density. M. Grandeau compared many samples of oats, and found a rather wide diversity between them, with regard to their natural weight and nutritive value. Thus, in different samples of oats, all weighing 57 kilogrammes to the hectolitre (125½ lbs. to 2¾ bushels), he ascertained that the nitrogenous matter was 8·19, 8·71, 9·74, 9·50, and 10·42 per cent., demonstrating that there is not a fixed relation between the richness in the useful elements in oats, and their density or weight.

It is also to be observed that the oats grown in various countries differ much in quality, in nutritive value, and in digestibility.

There can scarcely be a doubt that the contract weight (38 lbs.) per bushel of oats for army horses is too low, and especially when we know that they are chiefly obtained from Sweden and Russia, where the quality of this grain, and particularly the Swedish, is rather inferior. At least 40 lbs. to the bushel should be made the minimum standard; and it is needless to add that they should possess all the characters of sound and clean oats. Musty oats are particularly dangerous, and instances are innumerable of the damage done to horses by feeding them on such grain. One notable instance is recorded of such injury being inflicted on troop horses, in the case of the 12th Lancers. That regiment formed part of the British Army which occupied France for three years after the Battle of Waterloo, and the horses were fed chiefly on oats which had become heated and musty in the stores where they had been collected in large quantities.

Other kinds of grain food are sometimes substituted, wholly or partially, for oats, according to circumstances, but, as I have said, they cannot be recognised as equal to them. Maize approaches them closely, and forms the chief, often the only grain food of horses in several parts of the world. In South Africa our troop horses have been fed upon it and performed good service; and during the French expedition to Mexico the horses and mules sent from France received no other grain, and did well upon it. In the United States of America and in Mexico, it is the staple food of working horses, and in Europe it is now largely used, being even grown in some parts. General Rosenberg introduced it into the ration of the horses in the Prussian Army some years ago; and in Spain, Portugal, Italy, Hungary, and the Rhine Provinces, it has long been recognised as well adapted for horses performing hard work. It is very digestible and economical, and may replace

one-third, two-thirds, or even the entire ration of oats, weight for weight, if the seeds are broken previously. In South Africa the maize is given in stalk to the horses, these stalks and heads being known as "mealies."

Barley, as already mentioned, is rarely used in this country as food for horses; in France and Italy it is only given in the South. In the East it is almost the only grain allowed, not so much perhaps because it is preferred to oats, as because these cannot be grown in warm countries. In Spain, barley and chopped straw constitute the only forage, and the horses thrive well on it. In 1823, when the French Army entered that country, the cavalry and artillery horses soon became accustomed to it, and no ill effects were observed.

Rye is not a desirable food for army horses, and the same may be said of wheat. Millet is sometimes given to horses, especially in Southern Russia, where it grows abundantly; and, as jawaree, it is used for the same purpose in some parts of India and in North China. It is said that the Belooch mares in the Western Punjab receive scarcely any other grain, and they perform the severest marches on it.

Bran enters more or less into the ration of troop horses, especially on shipboard, where it is very useful. In the infirmary stables for sick horses it is most valuable. The chief drawback to its use in the field hitherto, has been its great bulk, inflammability, and tendency to become sour and mouldy in a short time, if exposed to damp. All this is entirely obviated by compressing it into large dense cakes, which are almost weather and fire-proof, contain a great quantity in a small bulk, and are easily transported.

Of the pulses, the most important is undoubtedly Beans, which should form a portion of the grain ration of all horses performing very long and severe labour, as they are a very stimulating and nourishing food. But beans require careful inspection, as they are so often unsound and infested by parasites. They should be split or cracked before they are given to horses.

Peas rarely enter into the ration of the troop horse in Europe, probably because of their being rather indigestible; though Gram, a kind of pea, is largely employed in India.

Other grains are sometimes given to horses, but so seldom as not to merit consideration here.

The different grasses furnish a very large proportion of the food of horses, and are more or less valuable according to their botanical order and condition. They are described as natural and artificial; the natural ones being true grasses, and the artificial not so, as they contain the clovers, lucern, sanfoin, and others of a like character, and which are rarely given to army horses.

The natural grasses are those best adapted for horses performing fast work, as they are less bulky and more easily digested. They are not given in the green state in Europe, unless occasionally in small quantity, as they contain too much water, and are unsuitable for working horses. When properly dried, however, in the form of Hay, they constitute an essential portion of the daily ration, and one-third of their weight in this state is more than equivalent in nutritive value to the full allowance in the green or undried condition. Hay varies considerably in feeding value, according to not only the grasses which enter into its composition, but also according to the situation, the soil, the districts, and even the countries in which it is grown; and also to the manner in which it is preserved or made.

It would be out of place here to describe the different kinds of hay and the characteristics of good hay, as they should be familiar to all who have to do with the provisioning or feeding of horses.

Suffice it to state, that hay should always be of recognised good quality,

both of growth and preservation. It is the natural food upon which horses can live all the year round without any grain, so long as they are not doing any or much work; as it maintains the temperature and the vital functions when no unusual demand is made upon these. But to supply the waste of the body caused by work, an abnormal quantity of hay would have to be consumed, and this would prove injurious. On the other hand, horses cannot live on grain alone. Experiments have demonstrated that after a week or ten days' feeding on good oats only, they gradually eat less, become dull and heavy, lose weight and condition, and are evidently sick of the too stimulating and concentrated food.

Much discussion has arisen as to whether it is best to give the hay long or cut. When given uncut there is no doubt that much of it is wasted, and a considerable time is consumed in masticating it. Persons who employ a large number of horses, find it more economical to have the hay chopped and mixed with the grain; and for army horses, and especially when on picket lines, chopped hay would prove a great boon, as the loss in the daily allowance is considerable, particularly if the weather be wet or windy. But the difficulty in obtaining it prepared in this way during peace-time is an obstacle, and in the field it could not well be fed to the horses unless a different kind of feeding or nose-bag were provided.

I shall recur to this point, however, in a few minutes; merely remarking that the bulkiness of hay, and especially if it be long, is a great drawback to its use on active service. It requires much transport, is easily damaged by wet, is very inflammable, and is troublesome to issue. It is a terrible encumbrance to the cavalry soldier when it has to be carried loose in the regulation hay-net. I know of nothing which can prove more worrying and hampering to cavalry in a charge, in passing through a thickly wooded or scrub-covered country, or in crossing streams or rivers, or even in wet weather, than hay-nets distended with hay. These should be abolished.

With regard to straw I have but little to say, as it does not enter into the food ration of our army horses, and is only allowed as litter. Though horses are sometimes partial to it, yet it contains very little nutriment, and it is too bulky and indigestible for horses performing hard or fast work. A small proportion, if sweet and chopped, gives bulk to the feed, and causes the horse to masticate his oats. For this purpose oat straw is preferable to any other. The difficulty attending the transport of straw prohibits its use in the field, where it certainly can be dispensed with.

2. *Special Forage.*—At various times attempts have been made to feed horses upon specially prepared foods, with the view of presenting nutriment in a concentrated and more readily assimilable form, and also, for armies, with a view to portability in addition.

In books on the training of horses published during the last century, directions are given for the production of what was called "horse bread," and during this century experiments have been numerous with various kinds of artificial and specially prepared foods for horses, more particularly for those employed during war.

I have already remarked that horses are extremely dainty in their food, and even in the matter of grass and grain to which they are unaccustomed, they will often prefer starvation to eating it. To animal food, especially, they have a particular objection, and the slightest trace of it in their ordinary forage will sometimes cause them to reject it. Their sense of smell is more acute than that of taste, though that is also highly developed. Yet, notwithstanding this delicacy of taste, horses will in time get over their prejudices, and eat what is otherwise very foreign to their nature and habits. In Iceland, for instance, the horses have no scruples at all in eating fish.

Not long ago, M. Müntz introduced a forage biscuit, composed of blood

and crushed oats and maize. The mixture was kneaded, cut up into cakes, and cooked in an oven or simply dried in a stove. When fresh they had an agreeable odour, and it is reported that horses ate them with avidity. If such food could be introduced, from its high nutritive standard it should, to a certain extent, advantageously take the place of ordinary forage, as the slaughter-houses could furnish a large supply of blood. But several conditions would have to be observed: the blood must be perfectly fresh and healthy, the biscuits should be well dried or baked, and they must be kept from damp. Otherwise, putrefaction must rapidly ensue.

During the investment of Metz by the Germans in 1870, attempts were made in the French Army to feed a certain number of horses on the flesh of those which had died or been killed. Veterinary-Surgeon Laguerrière, who made the experiments, reports that:—

1. The flesh of any animal can be used as food for horses.

2. The repugnance of horses for flesh is not nearly so great as is generally believed; for by proper preparation of the flesh, and by diminishing the ordinary ration, or even withholding it altogether at one or two feeding times, horses rapidly become accustomed to it.

3. Horses digest perfectly raw or cooked flesh, even more quickly and completely than they digest vegetable substances.

4. On flesh, horses thrive, fatten, and increase in vigour and energy, if it be given in addition to the daily ration, or even if it largely takes the place of the usual forage.

5. Raw flesh may be given to a certain number of horses, but it is preferable to boil it well; the water in which it has been boiled may be given them to drink.

6. Whether raw or boiled, the flesh should be finely cut up or hashed, then triturated and mixed with vegetable substances more or less alimentary, as leaves of trees, straw, hay, meal, grains, roots, etc., and, if possible, common salt added.

7. The flesh should be given in small quantities at first, gradually increasing the allowance. As much as $4\frac{1}{2}$ to $6\frac{1}{2}$ lbs. per diem have been given to each horse, flesh being then almost exclusively the daily food.

8. Certain horses readily took the mixture from the hand, others ate it from the nosebag, while others again preferred it from the ground or in the manger.

9. Several horses ate the morsels of raw flesh with only bran, meal, or grains sprinkled over them, or ate them when placed between leaves; afterwards these animals took them without any preparation whatever.

10. If the horses absolutely refuse this animal food, it is easy to overcome their repugnance by drying the cooked flesh, reducing it to a powder, and making it into a bread prepared with any vegetable substance.

More recently, and with a view to feeding army horses on active service with a highly nutritious food in small bulk, Scheurer-Kestner introduced a meat biscuit, in which the inferior flesh of cattle was utilised. When made with oatmeal, or barley, or maize-meal, to which one-third of flesh was added, the fermentation during baking dissolved the latter, and thus the vegetable ingredients were endowed with great reparative properties. This biscuit was reported as capable of being kept for several years without being damaged.

In England a similar biscuit has been tried with reported success by a Mr. Dunkelberg; and Spratt's dog biscuit, which contains a certain proportion of flesh, has been given to horses, which were said to eat it readily. It is stated that the desert Arabs have for a long time been accustomed to give their horses a meat biscuit or bread on certain occasions, when great exertion is required from them. Not long ago an experiment was made with a kind of bread or biscuit composed of crushed oats and the refuse of flesh left from the pre-

paration of Liebig's extract of meat; with this the horses of a cavalry regiment stationed at Deutz, Germany, were fed for some time, and the result was so satisfactory that the German Minister for War had a large quantity made at Mayence for a more extensive trial.

Bread or biscuit, composed entirely of vegetable matter, has been used for a long time in Sweden, Germany, Belgium, and Holland, and has often been tried in this country. Its use for army horses has frequently been put to a serious and extensive test. Owing to the difficulties attending the transport of forage in the field, the subject had for many years attracted the attention of military nations; but it was not until the Franco-German War of 1870-1, that attempts were made to decide the question of its utility. During that momentous event, it was found that, notwithstanding the good organisation of the German Intendance, the supply of forage, even in such a country as France—so full of resources of every kind, and with such ready facilities for moving them from one part to another—was often interrupted and precarious, especially for the cavalry. This was mainly owing to the new fashion introduced of employing that arm in widely scattered and far advanced detachments, to screen the advance of the slower moving troops, to act as scouts, and to keep touch with the enemy, instead of marching in masses close to their supplies, which were carried by the transport.

And even after the campaign was terminated, the difficulty was still present to the troops left to occupy the French provinces. There was very little forage of any kind left in the zone of territory occupied by them, and it was not an easy task to transport it from the neighbouring provinces. It was indeed with the greatest effort that a permanent supply of hay was procured for the horses of the Headquarter Staff. The German Treasury, moreover, suffered great losses in oats, partly on account of constant damage and deterioration to which this kind of forage is liable in transport, and partly also on account of the very high price that had to be given for this grain when supplies had to be purchased for the army.

So urgent did the matter appear to the military authorities, that the Commander-in-Chief of the army of occupation, Field-Marshal Manteuffel, and Intendant of the Army, Herr Englehardt, were, in 1872, induced to appoint a Special Commission to make trials of various sorts of condensed forage, prepared by Herr Warnecke, in a large and most complete laboratory established by the German Government at Nancy for the supply of preserved provisions for the troops. This compressed forage took the form of biscuits (*Pferde kuchen*), prepared with the meal of various grains in certain proportions. There were three kinds of biscuit, designated as 1, 2, and 3. They were composed as follows:—

No. 1.	Per cent.
Oatmeal	30
Rye-meal	30
Ground linseed	10
No. 2.	
Oatmeal	40
Dextrinated pea-flour	40
Ground linseed	20
No. 3.	
Dextrinated pea-flour	20
Wheaten flour	20
Ground Indian corn	20
Rye-meal	20
Bread-waste	10
Ground linseed	10

A small proportion of salt was added.

The ration of biscuit varied, but it was estimated that about 4 lbs. were equivalent to 11 lbs of oats, and that 6 lbs. per diem would enable a horse to undergo extraordinary fatigue, even if not supplemented by any other forage. Each biscuit was four inches in diameter, and the 4 lb. ration occupied a space that width, by fifteen inches in length. They were either strung on a wire or carried in a canvas bag for conveyance on the saddle, and when given to the horse were broken in pieces, and eaten either dry or after being soaked in water.

The trials of these biscuits were begun by the cavalry of the German Army of occupation in 1872, on an extensive scale, and prolonged for ten months without interruption. One hundred horses were experimented upon on each occasion for ten days; fifty were fed with hay and oats as usual, the other fifty being fed solely on the biscuits, which had been manufactured a year. The result of these trials was reported as most satisfactory, inasmuch as the horses fed with the biscuits were, during the whole period, full of vigour and spirit; and while the trial lasted the average number of sick horses was seventy-five per cent. less than with those foraged in the usual way. A large Committee of Officers, among whom were the chief veterinary surgeons, decided in 1873 that these forage biscuits were excellent, and that they answered the requirements perfectly. Such distinguished chemists as Liebig and Fresenius also gave their opinion in favour of this concentrated forage, and asserted that it entirely fulfilled all necessary conditions.

Other trials were made with this biscuit, and in the end the results were deemed so satisfactory and so conclusive, that it was decided to build, with the remains of the war indemnity placed at the disposal of General Manteuffel, three factories for making them (and also preserved rations for the soldiers), at Mainz, Berlin, and Ratisbon, and on such a scale that in the event of war they could manufacture many thousands of rations daily of this forage; at Mainz 19,000 rations could be made per day.

The success of these experiments in the German Army induced the Russian military authorities to institute trials of forage biscuit in some of the Guards cavalry corps, and also in the cavalry of the Odessa and some other commands. Those in the Guards cavalry were carried out on the same principle as those in the German cavalry. A certain number of horses were selected, and for the first twenty-five days they received 4 lbs. biscuit and 10 lbs. hay. Then $\frac{3}{8}$ lb. biscuit was added, and 2 lbs. less hay allowed until the thirtieth day, when the horses received nothing but 6 lbs. biscuit per diem for several days. At the termination of this trial, the vigour and general condition of the animals was found to be equal to that of the horses fed on the ordinary ration. The experiments in the other corps were equally satisfactory, and the consequence was that the Russian Government followed the example of the German Government, and in 1877 established a biscuit factory at St. Petersburg, at Moscow, and at Ekaterinoslaw. That at St. Petersburg can turn out nearly two tons of biscuit a day. The composition of the Russian biscuit was, in 1879, as follows:

		Per cent.
Oatmeal	from	35 to 40
Rye-meal	„	25 „ 30
Pea-meal	„	15 „ 20
Linseed-meal	„	9 „ 10
Common salt	„	$1\frac{1}{2}$ „ —

During the Russo-Turkish War, when no fewer than 20,000,000 rations of this biscuit were consumed in the Russian Army, its composition was:—

		Per cent.
Oatmeal	from	30 to 40
Pea-meal	„	30 „ 50

Barley-meal.....	from	10 to 20
Linseed-meal	,,	15 ,, 20
Common salt	,,	1 ,, 5

The factory at St. Petersburg, during the war, furnished 20,000 rations daily, and had at the end of September, 1887, despatched more than 500,000 rations for the use of the active army.

Each biscuit was $3\frac{1}{2}$ inches in diameter and $\frac{3}{4}$ inch thick. They were strung on a wire or string, which passed through a hole in their middle, and by it were attached to the saddle. During the passage of the Balkans and the subsequent advance into the neighbourhood of Constantinople, all the horses of the cavalry and artillery of the Russian Guard were fed entirely upon the biscuit for twenty-six days, and are reported to have kept in excellent condition all the time, although hard worked and exposed to inclement weather. The only disadvantage found in their use, was that the soldiers stole them to eat. The Germans prevented this by adding five per cent. lupine seed. A horse could carry from two to five days' rations, and the biscuits were given either wet or dry, but always broken; the horses were fed on them three times a-day, at 7 a.m., noon, and at 7 p.m.

The German biscuit was tried in the Austrian Army, but the result was unfavourable.

France has, on several occasions, made trials of forage biscuits, notably those proposed by Army Veterinary Surgeon Naudin and M. Barthe. These biscuits were tried in France in 1878, and with the cavalry in Tunisia more recently; but the results do not appear to have been sufficiently satisfactory to induce the French Government to adopt this kind of forage.

The Italian Government, in 1878, instituted experiments at Salerno, with a similar biscuit introduced by Colonel Ravelli, the experiments being carried out on cavalry horses, sixty-four in number, for a month. Thirty-two of these were fed on the biscuit only, sixteen on it and hay, and sixteen on it and oats. The first received nearly 11 lbs. of biscuit per diem, the second $3\frac{1}{4}$ lbs., and the third 3 lbs. 2 ozs. The last two consumed, in addition, the first, 11 lbs. of hay, their usual ration; the other 7 lbs., their oat ration. In the early days of the experiment, the precaution was taken to soften the biscuits in water, so that they might be more easily eaten by the horses. Some did not take to it well, and two or three of the Maremma breed absolutely refused it. In the third, fourth, and fifth days, some of the horses fed on the damped biscuits only, showed signs of gastric disturbance; when fed on dry biscuit they all recovered. Those on the mixed food, with two or three exceptions, did not show any signs of indigestion during the month, and preserved their vigour; though they looked rather empty, as did the others. The conclusion was favourable to the use of biscuits, and it was recommended that in camp and during war the ration should be increased to 13·2 lbs., and also that they should be given to the horses during peace, in order to accustom them to this food.

The great importance of the subject of quality and transport of forage has not escaped the attention of our own Government, but, on the contrary, has received much notice from it since the Russian War of 1854-55. For the war in North China in 1860, and also for that in New Zealand in 1863, and in Abyssinia in 1867, compressed hay mixed with oats was sent as forage, and was reported upon as a great improvement on the ordinary forage, though objectionable in some respects; for instance, waste of grain in issuing the forage, and the drawback in having the hay and oats together when only one of them was wanted, as well as the defect that one could not be increased without also increasing the other.

(*To be continued.*)

PRELIMINARY REPORT OF THE BOARD APPOINTED TO MAKE FULL INQUIRY INTO THE ORIGIN AND NATURE OF A PREVALENT DISEASE AFFECTING STOCK, COMMONLY KNOWN AS "MANGE," IN QUEENSLAND.

(*Continued from page* 186.)

The title, then, to the designation "mange" as a true definition of the disease under investigation would seem to rest on the discovery at Ipswich by Dr. Lightoller of a single specimen regarded by Mr. Pottie as "closely resembling the *Sarcoptis*." It is doubtless this insect which gave rise to the following telegraphic communication in the *Brisbane Courier*, 15th March, 1888:—"The insect to which the disease known as Queensland mange is due, is said by an expert who has examined specimens to belong to the Acari family, and is closely allied to the insect which produces scab in sheep." The means of measuring the degree of affinity of the species of acarus represented by this celebrated specimen to the two species above named is not available, but it may be safely inferred, however, that it is neither of them. Is it not an example of an acarus commonly met with in collections of the scurf made from animals suffering from the disease? and, therefore, nothing more than a species of *Tyroglyphus*, a mite which feeds on dead animal matter, just as another species of the same genus lives at the expense of our cheeses. This is an acarus which can only be detected with the naked eye when it comes between it and the source of light, so small are its dimensions. As far as investigations have been conducted, no scab or mange insect has been detected, neither on the under surface of pieces of attached dead cuticle which have been removed in quest of them, nor beneath veritable scabs existing as secondary consequences of the presence of the disease. We have, therefore, no hesitation in stating that the affection under investigation is not a variety of mange.*

Others have suggested that the exciting cause of the disease may exist in the presence of some insect which alights on the horse, and then inflicts injury upon it. Thus Mr. W. H. Caldwell, of Pialba, in a letter dated 27th February, writes: "I beg to inform you that in this district the horses are attacked by a minute insect with pure white wings, which immediately on alighting upon the animal make their way under the hair," and "it is certain that a beast after being attacked by these insects will rub itself against fences, trees, or anything at hand." A son of Mr. Joseph Sellars, of Rosevale, narrated a similar observation to that related in the former of the two preceding statements. The insects are said by some to be about only at peep of day. However, the members of Board, on examination of a mob of diseased horses at this time, did not see any evidence of the existence of this insect, except such as was afforded by the presence of a small beetle, which alighted

* This misnomer, too, has doubtless also arisen from writers, even of repute in veterinary science, having under the heading "mange" treated of a disease which, from their description, cannot be it. Thus Mayhew, in his "Horse Doctor," relates of a disease, which is no doubt the one being now investigated here, that "it first appears as a dry scurf amongst the hairs of the mane, extending to all parts except (very rarely) the legs; great itching, hair falls off, and the vacant places look as if they had been burned by quicklime. Further, the skin thickens and is corrugated with folds. A few hairs remain, very hard to pull out, and when pulled out are found to be enlarged or bulbous at the root; and upon examining the raw places small pimples are seen [? the papillæ of the cutis.—H. T.], which burst (?) and form an itching scab. It is stated to be quite impossible to forebode an attack of mange. The horse rubbing himself against posts, and showing delight when he is scratched under the mane are the only signs of its presence."—(Quoted in *Queensland Times*, Ipswich, 10th March, 1888.)

on one of the horses. A larger beetle, which was stated to have alighted upon a horse's back, and to have at once commenced to dig its way into the hair, proved on examination to be a species of Adorium. It is improbable, however, that any insect, unless occurring in such numbers as to be very conspicuous by its presence, could cause such an extent of disease, much less one of such nature, as the one under investigation is described to be. Notwithstanding, the very first symptom mentioned does certainly simulate the injury caused by the sting or bite of an insect.*

Having now disposed of the different theories as to the cause and nature of the disease, it remains to point out that the true exciting cause of this affection resides in the fungus sporules present in such innumerable numbers. These living organisms having invaded the more superficial cells of the cuticle,

* Since this report has been written, specimens of minute dipterous insects, and probably identical with these referred to by W. H. Caldwell, of Pialba, were brought to me by Mr. J. P. S. Pinwill, Ranger for Crown Lands in the East Morton District. Mr. Pinwill, from his own observations at Oxley, had concluded that the small flies which he handed to me alighted on cattle and entered amongst the hair, and as soon as they had found the skin filled themselves with blood. They then crawled up the hair and flew away. He had not remarked their presence on mangey horses or cattle, but was of opinion, although without experience as to this being so, that the disease would follow the attacks of these insects. These minute flies belong to the *Psychodidæ*, and seem to be referable also to the typical genus of that family, *Psychoda*. This genus comprises small flies with broad, very short, oval whitish wings, which like the body are very hairy. They may be seen flying and leaping on the banks of, or on the surface of pools, and on windows. The larvæ feed on dung (Packard). These little insects are very familiar objects, and might be very commonly observed on dirty windows, certainly in Brisbane, ever since 1881, during many months of the year. Residents at Oxley state that they have been noticed for years past and that they commonly congregate on cows, usually during the evening and morning, and especially at such times as they are brought into sheltered places to be milked. That they also bite the cattle is most probable in view of the fact that their mouth organs are suitable for such a performance, and also since the habit has already been observed in the family *Psychodidæ*. According to Schiner (*Reise der Novara, Diptera*, pp. 28, 29), a genus of *Psychodidæ* has been named, independently, *Phlebotomus* by Rondani, and *Hœmasson* by Loew, doubtless, as now appears, in allusion to this trait, the existence of which seems to have been perceived by these investigators. Unfortunately the works of the two specialists mentioned cannot be consulted, so that it is incompetent to state whether the Queensland insect is a *Phlebotomus* or not. The family is a small one, though universally distributed, and contains about thirty species. Australia has not hitherto been credited with a representative of it, but New Zealand has the *Psychoda conspicillata*, Hutton. Formerly these insects were included in the gall-fly family, *Cecidomyidæ*, with which, from an anatomical point of view, they have much in common. Did these species of *Psychoda* give rise to the disease under investigation this might be expected to occur more generally over the surface of the body, and the initial lesions would be met with much more densely than is known to be the case. Also, it might be anticipated that in other countries, where these flies exist, they would too have been found in them also to be causally related to this or to some allied disease. This is not the case. In the absence of any condition or conditions which with sufficient reason might be regarded as the true cause of the disease, these flies then might possibly be considered as fulfilling this office; but when an efficient cause is made out there does not seem to be sufficient evidence to admit of its being dismissed in their favour. Whether they actually occasion lesions in the skin, and whether these serve as favourable situations for the operation of the true cause of the disease, cannot at present be decided, nor is this probable from the facts known concerning the associated occurrence of insect stings or bites, and skin diseases generally. In fact, is there more evidence to connect, in the way suggested, these *Psychodidæ* with the present affection in stock than there is to attribute a similar relation to the familiar mosquito?

and the inner sheath of the hair bulb, and so having passed within the hair itself, live at the expense of the material on which the persistence of the vitality of these portions of the tissue depends. Accordingly these cells of the cuticle and hair die, and although they are discarded by desquamation and shedding of hair, this action only slowly takes place, and accordingly there is always a mass of dead material existing on the surface, which thus irritates the true skin and causes, as is very evident, intense itching.*

In fact, the disease is nothing more than what in veterinary works is designated "Parasitic Ringworm," and thus one which is not peculiar to the colony. Mr. Fleming mentions several instances quoted by authorities of the occurrence of *Tinea tonsurans*, or Ringworm, on horses (*vide Veterinarian*, May, 1872). Mr. G. Armitage, M.R.C.V.S., in "Every Man his own Cattle Doctor," London, 3rd edition, p. 570, writes of it under the heading "Ringworm," and quotes Professor Gerlach, of the Veterinary School of Berlin, as follows :—

"The squamous crust is about two or three lines in height, and has a greyish white, fibrous appearance. At first the crusts are very firmly adherent to the skin, and if detached from it leave a bleeding surface; they afterwards become less so, and ultimately fall, leaving patches of hair" (*sic*). "The eruption commences by little circumscribed points about the size of a pea, which increase peripherally, and thus gradually form the scaly crusts, which generally fall off from six to twelve weeks after the first appearance. On examining the crusts with the microscope, long chains of quadrangular sporules are observed. There are also a large number of round isolated cells.

"The parasite (*Trichophytes tonsurans*) is formed in the hair follicles. In well-developed crusts a layer of sporules surround each hair, while in less perfect ones some hairs are quite free from them."†

Similarly, J. R. Dobson, in "The Ox and his Diseases," pp. 233-4, and other veterinary writers, refer to Ringworm as a disease of horses and cattle.

* The constant presence of the minute organisms in connection with the disease, even as soon as the primary lesion can be recognised, as well as the condition of those portions of the tissue in which it exists, supports the view that in reference to it they are pathogenic or producers of the disease, even if it were not known that when similar bodies occur in analogous skin affections they are regarded as undoubted causes of these diseases. This remark is called forth in anticipation of the objection that they are saprophytic—*i.e.*, plants feeding on dead animal matter. Notwithstanding, it is evident that for the establishment of this relation as a scientific fact, it is necessary to be able when given the parasite to produce the disease. Further still, in order to ascertain whether this given disease is due to this special organism, the following procedure must be adopted :—"In the first place, the pathologist does ascertain whether an organism, and which organism, is present in the diseased tissues. In a variety of ways he studies the characters of such an organism by fresh examination, by methods of staining with various dyes, and by cultures. By this latter method he not only studies their behaviour in various culture media, but at the same time isolates the organism in order to obtain pure cultivations. Having then obtained unmistakeably pure cultivations, he proceeds to inoculate suitable animals with them, and ascertains whether this purified organism is capable of again producing the same disease from which it had been originally derived. And further, in this so induced disease, the same organism must again be detected; by morphological study, and by the method of culture, it must become clear that in his new infection we meet with exactly the same organism as in the original disease."—E. Klein: "Bacteriological Research," *Journ. Chem. Soc.*, 1886, p. 197.

† Though allowance be made for some misrepresentation of the facts actually recorded by Professor Gerlach, owing to the imperfect rendering of the German idiom, it is evident that the variety of Ringworm—the subject of his remarks—though allied to, is not identical with the Queensland disease.

See especially Fleming's "Manual of Veterinary Sanitary Science and Police," vol. ii.. pp., 464-471.*

The most noteworthy and pertinent reference to this subject is, however, contained in the following quotation:—"A very instructive history of an epidemic of *Tinea tonsurans*, or, as it was called, *Epizootic herpes*, occurring a few years since amongst some 300 mules and horses in the Valley of Borne, in Savoy, is given by Professor Papa, who was instructed to investigate the circumstances connected with the epidemic. A number of instances are recorded in which the disease was communicated direct from horse to man, man to man, man to wife, and wife to infant. The disease attacked the horses and mules about the head, the neck, withers, shoulders, and loins. It was itchy, and at first thought to be due to *acari*, but its real nature soon became apparent. In the cases observed by Professor Papa, the communicated disease in the non-hairy parts of the men was an exaggeration, so to speak, of ordinary so-called *Herpes circinatus*, or properly *Tinea circinata*, as in the cases which have just come under my observation, though this peculiarity was not pointed out by the Professor.† The patches of disease were, I notice, said to be studded over here and there with small pustular points, (This is also sometimes so in the cases of the present disease.—H. T.) indicative, as before observed, of a more than usual amount of irritant, and produced by a plentiful sowing of the fungus elements upon the skin."—Tilbury Fox, *op. cit.*, p. 455.

It should be borne in mind that the disease under investigation during no stage of its development, except at the very onset when minute ones are formed, develops true scabs. They do, however, occur as the result of secondary changes. But there is so much vagueness implied in the designation given to the elementary lesions of skin diseases by people generally,

* In a brief article on "Vegetable Parasitic Skin Diseases," by Richard W. Burke, M.R.C.V.S., A.V.D., etc. (*The Veterinarian*, vol. lxi., No. 722, p. 78, London, Febr., 1888), the following maladies of this class are alluded to viz. :—(1) *Herpes tonsurans*, (2) *Favus*, and (3) *Impetigo contagiosa*. The author states that "it is not known positively whether even these two [*i.e.* (1) and (2)] are actually caused by a fungus or by tissue change." Notwithstanding, without further comment, he proceeds to state that Mégnin has met with two species of *Trichophyton* "attacking animals": (*a*) one accompanying a disease "resembling *Herpes circinatus*, which he finds to be due to a new species of *Trichophyton*," and the other (*b*), the above *Herpes tonsurans*. Mr. R. W. Burke also is evidently of opinion that (*a*)—*i.e.*, Mégnin's *Tinea epilans*—is one of those he himself first mentions. By way of further contradiction he adds:—"Besides the above three skin diseases *due to vegetable parasitic action* there are others described in which a fungus has been found." Two such, then, he in conclusion refers to. His No. 1 is otherwise known as *Epizootic herpes*, and more correctly *Tinea tonsurans*.

† Since the above quotation has been transcribed, an interesting fact bearing on the relation between two forms of *Tinea* has come under observation. A chestnut mare belonging to Mr. E. J. Armstrong, of Milton, was reported as having both "Ringworm" and "Mange," the latter recently developed. On examination of this animal, the writer found one solitary and nine adjacent spots on the hind quarter; these were all quite separate. They were nearly circular, and each about the size of a shilling, and somewhat raised above the general level of the surface of the body. The hair on these was being shed, and that which still remained on the neighbouring healthy skin above extended over these spots, which it covered except in the case of their lower borders. Hence a *circinate* appearance was produced. The "Mange" disease presented the ordinary characters. Hair and epidermis which were removed from the areas involved in the two diseased conditions were in both cases similarly affected, and under the microscope exhibited the presence of a fungus, that from one source not to be distinguished from that from the other. It was supposed that this mare had contracted the "Mange" from a badly and earlier affected black mare stabled during the day in an adjacent stall.

that by the term "scab" may be meant squamæ or scales—or dead portions of cuticle still adherent.

Predisposing Condition.—It would appear that there is no diathesis or predisposing condition favourable to the occurrence of the disease. Both old and young horses or stock take it. An instance of a foal, from four to six months of age, affected by the disease occurring at Wilson's Plains, Harrisville, has been brought under notice. Young stock, however, often escape. Stock in good as well as bad condition are also subject to it, neither does breeding seem to have any influence either in determining its invasion, or withstanding it. Animals constantly "worked," as well as such as do little, are alike attacked.

Origin and Dissemination.—The occurrence of the disease being due to the presence of minute vegetable parasites within the cells of the cuticle proper and its appendages, which, by disturbing the local nutrition of these parts, so occasion their death; there can be no doubt that the primary condition on which the origin of this disease depends is access to the body of such portions of these microscopical fungi as are capable of development. And, as this can be readily brought about, there can be no doubt that this disease, like all other parasitic diseases, may be regarded as contagious. Writing of the closely related Ringworm of human beings (*Tinea tonsurans*), Dr. Tilbury Fox states that when once introduced, this disease is spread in several ways, and that one of these depends on the fact that the air under some circumstances "is loaded with the germs of the fungus *Trichophyton tonsurans*," which are capable alone of giving rise to it. He adds also: "I am particularly anxious to call special attention to the last point. When I came to collect the dust deposited from the air in the wards of the institution in which the outbreak of Ringworm before referred to occurred, I found that it contained fungus elements in abundance;" also that "epithelial scales were found in the dust,"* which, as there represented (figs. 71 and 72), were infested with fungus sporules.

The contagious nature of the present disease is borne out by facts in abundance. Amongst numerous other instances which might be quoted in support of this conclusion, Mr. P. Cannan, of Mt. Walker, stated that he had one horse affected with "Mange" last year, and eight this, and that the mare which retained the disease all the winter (of 1887) through, developed it with fresh virulence during the spring of this season. And, indeed, it is a general experience that on runs or farms where this skin affection occurred last season it has shown itself with increased virulence this; not only in the particular class of animals in which it first manifested itself, but also in cattle. The same witness states that his cattle running with the horses had never the disease previous to this season.

Mr. William Allen, M.L.A., who introduced the deputation which waited on the Colonial Secretary in reference to the subject, is reported to have made the following remarks in his address: "There are stations between Yeulbah and St. George that were last year quite uninfected. Two of Cobb and Co.'s coach horses, however, have become diseased, and the horses along that line that came in contact with them are now suffering. At the Millungera Station there were over a thousand horses with not a sign of the disease amongst them until a traveller came along with two horses which were affected with it, and then the disease went through the whole lot." That the spores of the specific fungus which always accompanies the disease exist in abundance in the dusty and furfaceous matter which infest the hair of an

* "Skin Diseases," p. 443. See also the very important article "Découverte des spores de l'Achorion dans l'air qui entoure les malades atteints de *favus*." Extract of a note by M. J. Lemaire, *Comptes Rendus*, T. 59, pp. 127-8, Paris, 1864, which is instructive, although this disease is not *Favus*.

affected animal, and are being continuously shed by it, is a matter of easy demonstration. Also, that horses and stock generally, when affected with it, are constantly rubbing against one another ; the unsound often against those which are perfectly healthy. In a similar way different parts of stables and yards may become indirect sources of infection. But further still, there can be no doubt that the air passing over an infected beast receives a charge of fungus spores ; especially seeing that, when subject to the irritating presence of the disease, the animal is constantly quivering its skin by the aid of the special muscles with which it is endowed for this purpose.

However, there is still another condition which determines the origin of the disease, and this consists in the occurrence of certain circumstances essential for the development of the fungus, or, at least, a special pathogenetic property in it. That this is so is an undoubted fact, and is tacitly assumed every day when affected animals are not segregated and isolated, and still there does not arise further cases of the disease in previously healthy animals than when this is done. It explains the experience already on more than one occasion brought under the notice of the Board, that saddles are transferred from so-called "mangey horses" on to sound ones, and *vice versa*, ever and anon, without the latter being invariably infected by the disease ; also, that mares which have the disease exceptionally only prove sources of infection for foals which are running at their feet. In fact it disposes of all the negative evidence which may be adduced to militate against the view regarding the disease as an essentially contagious one. Were no such check opposed to the dissemination of the disease, there can be no doubt that, owing to the well-nigh infinite number of fungus sporules developed by a single infected animal, and their extreme minuteness which enables them to form, as it were, motes in the sunbeam, and especially under the conditions under which stock are depastured in the Colonies, no immunity from the disease could be even hoped for. But the checks are doubtless very formidable ones ; it is these that have prevented isolated cases of so-called "Infectious Ringworm," which is no new skin affection in European countries, from spreading the disease on every side. It is the suspension of the operations of these checks which has given rise to this epidemic which has existed in Queensland these few seasons past, and to similar ones which have previously arisen in other countries. Dr. Tilbury Fox refers, as we have previously seen, to such an epidemic of *Tinea tonsurans* or Ringworm "occurring a few years since amongst some 300 mules and horses in the valley of Borne, in Savoy," an instructive history of which, as he informs us, has been written by Professor Papa, on whom devolved the duties of investigating the circumstances connected with it.

The nature of these checks are at present unknown, or rather the circumstances favouring the virulent development of the Ringworm fungus ; but it goes without saying that an original source of the disease must, at some time or other, have occurred in the existence of some animal or animals—feral or domestic—in which the disease occurred, with the seeds of which the stock of the Colony must have been brought in contact. Yet it must be borne in mind that the spores constituting these seeds may have remained for a considerable time with their manifestation of vitality suspended, or may even have been propagated in media other than those afforded by the tissues of animals subject to contagious Ringworm. These events are highly probable in view of the discoveries made in the recent science of bacteriology, and the latter event especially so, seeing that the particular spores of the fungus occasioning the disease under investigation may be cultivated in such a medium as glycerine and water. We can only surmise what the checks may be ; epidemics of this disease rarely occur, so that we may reasonably suppose that they reside in the ordinary circumstances of the life of stock. The favouring circumstance for the development of the pathogenetic virulence of

the fungus may be occasioned by the arising of some nice relation between atmospheric humidity and temperature, for bacteriologists have taught us that whilst the special pabulum on which microscopic fungi will live is variable, the use of the warm and moist chamber is necessary in order to produce conditions favouring their development; so that after all there may be some truth in the statement that "the disease in question may be the result of heat and wet," but not that it "is not contagious," though in the absence of these favouring conditions the contagious feature may cease to be manifested.*

Treatment.—The treatment to be employed is indicated by the nature and origin of the disease. The most expedient measures to be adopted await the decisions of the Board, to be arrived at as the outcome of systematic experiments carried out, as is here recommended, under their direction. Meanwhile, the general nature of the course to be availed of may profitably be considered. The special method of procedure will of necessity depend on the class and quality of the stock to be dealt with, and the conditions under which the animals are reared and maintained. Obviously, too, these same considerations will decide whether measures, the adoption of which necessitates much monetary outlay, can profitably be employed; but whatever method shall be decided upon as being the best for use, it must be borne in mind that it must be repeated with sufficient frequency—that is, as often as it may be inferred that the agents have ceased to exert any influence, or have been removed by evaporation or rain. For instance, the absence of the characteristic odour of carbolic acid is an indication for the renewed use of the application containing it. Nor must the fact be lost sight of that we have in this disease one that is very difficult to stamp out, and one which it is not likely will vanish, after an animal has been treated once only.

Preventive Measures.—It cannot at present be definitely laid down what these should consist in. In a closely-related disease in the human subject, cleansing the hair and then greasing and oiling it is recommended. This plan, then, might in certain cases be profitably carried out, at least as far as the oiling is concerned.

Eradication.—Treatment with this object in view must be directed towards getting rid of the vegetable parasite, the cause of the affection, or at least indefinitely checking its further development. Its exact nature can only be pronounced with certainty when the effects of agents on pure cultivations of the organism causally related to the disease have been experimentally demonstrated. It may be remarked at the outset, that, as the hair of the body is periodically shed (as is not the case with that of the mane and tail), no direct harm can result from removing it, at least by mechanical means, to the extent of the affected areas. Its removal will eventually occur in the course of the disease, and such a procedure, as a preliminary measure, will serve to admit the full operation of whatever parasiticide it is decided to employ. Failing this—and there are many reasons that conspire to render such a course inexpedient—it is desirable that the affected parts should be early washed by means of a stiff brush and plenty of soap, preferably soft soap. As, too, it is essential that the agents used should reach to the full depth of the hair bulbs, it is necessary that they should be suspended or dissolved in some easily penetrating medium, and that neither it nor they be readily dissipated by evaporation. Emulsions, soaps and ointments, therefore, are preferable

* In seeking for the source of the present epidemic, I am reminded of the occurrence, frequent in Queensland, of Ringworm about the eyes and face generally of calves, and although a superficial observer may discard the notion that this disease and the so-called Mange have anything in common, I am not of this opinion, bearing in mind the genetic connection between the different forms of *tinea* disease, manifesting outwardly such distinct characters, in human beings.

to tinctures or infusions; vaseline and glycerine, as menstrua, to simple fatty substances. Amongst disinfectants or destroyers of vegetable organisms there are certain chemicals which contain as parts of their constitutions acids of (1) chlorine, iodine and bromine; (2) boron, and (3) sulphur; also certain compounds belonging to the carbon series, such as carbolic acid or phenol, the creasotes, salicylic acid, and tobacco.

(*To be continued.*)

THE BALTIMORE VETERINARY COLLEGE.

If progress in Veterinary Science is to be estimated by the number of schools inaugurated to cultivate and teach it, then surely its advancement must be rapid in these latter years, and in no part of the world is this so remarkably evidenced as in the United States of America. Very soon we may expect to see each State provided with one or more Veterinary Schools, and when that happens it may then be found that what is occurring in this country will be manifest on the American Continent, the supply of graduates will greatly exceed the demand.

The directors of the Baltimore University, impressed with the value of what they term the "Veterinary Art," have organised a Veterinary School, and secured what appears to be a very competent staff, in which we find R. Ward, F.R.C.V.S., assuming a very prominent position as a teacher, while installed as President of the Faculty. The school will open to-day (October 1st), and students must be of good moral character, possess a fair education in English, and have a knowledge of Latin. The course of instruction terminates on March 15th next, when an examination will be held, when those students who pass will be eligible to enter the second year's course; at the end of this there will be another examination, those who successfully undergo it being eligible to go up for the final test, upon passing which they will receive the diploma of Doctor of Veterinary Science.

Under the auspices of the Baltimore University this school makes a good start, and we feel sure, from personal knowledge, that our esteemed and energetic colleague, Professor Ward, will do his utmost to make it a success.

Proceedings of Veterinary Medical Societies, &c.

LINCOLNSHIRE VETERINARY MEDICAL ASSOCIATION.

A meeting of the above Association was held at the "Red Lion" Hotel, Boston, on August 15th. There was a good attendance of members, including Messrs. B. Freer (Uppingham), President; F. L. Gooch (Stamford), Hon. Secretary; T. Greaves (Manchester), W. H. Brooks (Fulbeck), W. G. B. Dickenson (Boston), J. W. Gresswell (Peterborough), C. Hartley (Lincoln), J. Mackinder (Peterborough), T. J. Marriott (Bottesford), G. Osborne (Fulstow), T. A. Rudkin (Grantham), and Captain B. H. Russell (Grantham). Mr. L. Mitchell, M.R.C.V.S, was present as a visitor.

The President, (B. Freer, Esq., M.R.C.V.S.), at once proceeded to deliver his inaugural address, as follows:—

Gentlemen,—I must first thank you very heartily for placing me in this proud position, and although I feel and know that the duties attached are somewhat onerous, I can assure you that it will be always my earnest endeavour to fulfil them to the utmost of my ability, and to do all that lies in my power to further the interests of this Society. I venture to hope that

you will support me by attending the meetings, and by freely joining in the discussions on the subjects which will be brought before you.

This Association is now in its seventh year, and although its growth is but slow, I believe it is sure, and thanks to our excellent Treasurer and Secretary, a substantial balance now stands to our credit. I, for one, should like to see our meetings better attended. The places of meeting are carefully selected, are comparatively easy of access, and many excellent subjects have been brought forward, and have provoked profitable discussion. This is the second largest county in England, and living in it there are something like seventy members of the profession. If more would join us, and I am sure no one will ever regret having done so, we ought soon to take our place as one of the foremost societies in the land.

Our profession, during the last decade, has made very rapid strides, and although the penal clause has not at present brought about all those glorious advantages we were led to expect, let us hope there is a good time coming. We are certainly in a very different position, socially and otherwise, from that of our fathers forty years ago. Our literature has received many valuable additions, notably the works of Dr. Fleming, Professor Williams, and the late Professor Robertson, each and all of which are of great value to the practitioner. Last year saw the production of a very valuable quarterly work, the *Journal of Comparative Pathology*, and almost at the same time a much-needed, instructive, and occasionally humorous weekly pamphlet, the *Veterinary Record*. I am sure Mr. Hunting deserves well of us all, and I hope he will be well supported by the profession, not only pecuniarily, although that is a most important point in these matter-of-fact days, but by members of the profession contributing cases of interest, and also by freely ventilating their opinions on matters specially pertaining to the profession. We cannot learn too much, and is it not often more easy to learn by reading and thinking over short and instructive articles, or by listening to and actively taking part in discussions at such meetings as these, than by poring for hours over some ponderous book? Our Pharmacopœia has received numerous, and in some instances valuable additions, but as "all is not gold that glitters," many of these have not the all-powerful virtues ascribed to them. How different is much of our treatment from that of our predecessors fifty years ago! Theirs is pretty well summed up in the epitaph to a Dr. Isaac Letsom—

> "I bleeds, I physics, and I sweats 'em,
> And if they dies—why, then
> I. Letsom."

Their treatment, especially in bleeding, was no doubt very heroic, but I think that many of us are apt to err too much in the opposite direction. Who is there here who, after perhaps an hour or two spent in fruitless endeavours to relieve a horse suffering with spasmodic Colic, after withdrawing four or five quarts of blood, has not had the pleasure of seeing the animal relieved and looking about his box for food? Or, mayhap his patient has been a plethoric cart-horse blowing like a steam-engine and dead lame on one leg; has not a rapid blood-letting literally cut short the attack? The administration of alkaloids and other powerful drugs by the hypodermic, intravenous, or intratrachial methods has done away with many difficulties we formerly had to contend with.

In Tetanus, violent Colic, irritative Fever, and many other diseases these methods of administration are especially useful. Surgery as applied to our profession has made even greater strides than medicine. Certain regions of the equine or bovine body, the surgical interference with which a very few years since would have been considered madness, are now simply play-boxes for

the skilled operator. Who could have thought twenty years ago of puncturing the abdomen of the horse with a trocar and canula? But when done soon enough and, if necessary, often enough, it is a very valuable operation. The removal of tumours has been much simplified by the addition to our stock of instruments of the ecraseur, and surgical interference with the teeth, although requiring strength and patience, has been rendered much easier by the invention of powerful and useful shears and forceps. But the crowning operation, as far as surgery goes, is the one known as laryngotomy, an operation which has given rise to the dissemination of more angry words than any of its predecessors. Whether the operation will bestow upon the equine race all the advantages claimed for it remains to be seen. I, for one, sincerely and heartily hope that it will. I had, with many others, the pleasure of seeing Professor Axe operate on three horses at Wolverhampton, and could not help admiring the dexterous manner in which he completed each operation. Whatever may be its ultimate result, it has very strongly called our attention to the advantages of chloroform. Every one here has no doubt used this drug often and often, and has no doubt as often been disappointed with its results, *i.e.*, when administered with a large admixture of air; but now that we are practically sure that a strong horse can be anæsthetised in less than four minutes, with, at the outside, three ounces of methylated chloroform, I think we ought in all important operations to use it. I believe over a hundred horses have been placed under its influence at Woolwich without any danger, and in my small way I have, since March, chloroformed sixteen horses, with satisfaction to myself and to my employers.

There is one other question, gentlemen, which I wish briefly to bring before your notice. In looking down the lists of new members that are biennially pitchforked into the profession, have you never asked yourselves what is to become of them all? Many, no doubt, have been working hard for their diplomas, and are anxiously looking forward to the time when they will be able to take some of the duties off the shoulders of a hard-worked parent; and many others there are whose ambition is to join the army; others again, will away to distant lands—the United States and Canada, Australia, and other of our colonies have work in plenty for the skilled veterinarian, whilst the Argentine Republic and other South American States, seeing the enormous quantity of high-priced horses and cattle they are continually purchasing in this country, appear to offer great inducements to young men of experience and energy. The fact remains that we must be getting overcrowded. Veterinary surgeons in large towns bitterly complain of overcompetition and cutting down of prices, whilst we poor long-suffering practitioners in the country know how different it is now from what it was twenty years ago. Horses suffering from Colic are treated by their owners to two or three bottles of gaseous fluid or ethereal elixir, and their abdomens rubbed with Elliman's embrocation. Sore throats are stimulated with somebody's patent vesicant, and the hot mash is rendered doubly nauseous by the addition of some one else's powders. Splints, Spavins, and Ringbones are attacked with ossidine, or ossiline, or some other *ine*, whilst certain cures are flying about for all sorts of diseases. The treatment of sheep and lambs, particularly for tapeworm and Strangles, used in days gone by to make a considerable difference in the yearly returns; but it is quite a different thing now. Veterinary surgeons advertise in the local papers their lung specifics and anti-filarial mixtures; druggists send out certain cures, either of their own make or made up from some agricultural paper or other; whilst one or two sheep-dipping manufacturers not only bargain to cure Scab and kill ticks and lice, but guarantee to drive out tapeworm and cure Bronchitis in either lambs or calves with the same stuff. Wholesale druggists, in my opinion, are not doing much good to those who have been numbered amongst their best cus-

tomers; their pamphlets can be seen in many places besides the pharmacy of the Veterinary Surgeon, stating not only the prices of their balls and powders, but also giving the formulæ from which they are prepared. In fact, gentlemen, taking one consideration with another, our life, like that of the policeman, is not a happy one. What will it be ten years hence? The survival of the fittest. The weak will go to the wall, and although in this address I am not going to attempt any solution of the difficulty, one thing is certain, and that is the vet. of the future, if he means to follow the profession as a means of livelihood, must undergo a special training; must, besides the knowledge he possesses from books, be thoroughly grounded in the rudiments of his calling; must be able when he starts in practice to perform all ordinary operations with ease and dexterity; in short, must go about his patient as if he understood all about it. To ensure this the youth who thinks of entering the profession should spend a year or more, before going to college, with a gentleman in good practice, who in less than half that time would be able to tell the young man himself or his parents whether he looked like making a vet., or whether he would not be more at home behind the counter. I think it very unwise to send a youth straight to college without giving him the chance of finding out whether he is fitted or not for the profession he wishes to enter, and several men, to my knowledge, after passing their examinations with ease, have turned out miserable failures as country practitioners — one in particular, a college friend of my own, well educated but with no knowledge of domestic animals, who after passing his examinations went off in high glee to a remote part of England and started in practice. Clients flocked to him for a time, but as his want of practical knowledge and utter unsuitability in other respects became evident, they gradually left him. His want of success preyed on his mind, and in less than five years after obtaining his diploma he died in a lunatic asylum. I thank you all very sincerely for your kind attention, and I hope as each meeting comes round and the inevitable parting again takes place we may each and all feel that we have added something more to our store of knowledge.

The President's address was very warmly received, and he was asked to submit his paper for publication.

The minutes of the last meeting having been confirmed, the SECRETARY (Mr. F. L. Gooch) then read letters of explanation and apology for non-attendance from various members.

On the proposition of the PRESIDENT (Mr. B. Freer), seconded by the SECRETARY (Mr. F. L. Gooch), Mr. Tom Holmes, of Bourn, was elected a member of the Society.

On the motion of Mr. HARTLEY (Lincoln), seconded by Mr. MARRIOTT (Bottesford), Lincoln was chosen as the next place of meeting.

Various communications were brought next before the Society by the Secretary, some being of a semi-private character.

A letter from Mr. KIDD was read, asking for the attendance of a deputation from the Society at a conference to take into consideration the possibility of fixing the dates for Association meetings, so that meetings could not clash by being held at the same time.

The SECRETARY remarked that he had written to Mr. Kidd and told him the matter should be brought before the Society, and the result be made known to him. He (Mr. Gooch) had written to the President for his opinion, and Mr. Freer replied that he would be pleased to attend a conference, together with the Secretary, at some future date, but as he had not heard further from Mr. Kidd, he supposed the date of the conference had not been fixed.

Captain RUSSELL thought it was quite unnecessary for the conference to be attended. The matter might be very well left to the Associations them-

selves. They could best judge when the meetings might conveniently be held. It was not necessary to put the President and Secretary to the expense of attending the Conference, but if it was necessary that the Conference should be attended he would propose that the expenses be paid by the Society.

The PRESIDENT pointed out that they had not found it convenient to adhere to the rules as to the time of meeting. If they had held a meeting in June it would have clashed with the Royal Show at Windsor, and they naturally concluded that some members would like to go to the show. They thought, therefore, that it was best to postpone the meeting. In July the meeting would have clashed with the National Veterinary meeting in London. He did not see, in face of these alterations, how it was possible for a conference to fix any particular date for meetings. There were lots of things in a county like Lincolnshire that might crop up, of more importance than their meetings, to which they might wish to go. If they fixed a certain week, and the Lincolnshire Show was held that week, they would not get anybody at the meeting at all. The better plan was to leave the President and Secretary to fix the date of the meeting as soon as possible after the time appointed.

After some further talk, Captain RUSSELL gave notice of an alteration of Rule 5, namely, that the words "On the last Thursday" be omitted, and that an addition be made, "That it be in the power of the President and Secretary to name the date of the meeting, after taking into consideration the various meetings of other Associations."

INSPECTION OF MEAT.

A letter was read suggesting that the Government be memorialised to inquire into the whole question of meat inspection in Great Britain.

Captain RUSSELL asked whether it was wished that they should join other associations or send in a separate memorial.

Mr. DICKENSON (Boston) thought they might send in a separate memorial. In the *British Medical Journal* recently, a long article appeared on meat inspection, and details were entered into with respect to the subject. The writer to some extent praised the veterinary profession of to-day, but said that without doubt the veterinary surgeon was not the proper person to adjudicate upon the fitness of human food, but it should be left entirely in the hands of the medical officer of health. He thought that, as the representatives of a large county, they should not allow to pass unheeded this statement that they were not competent to undertake the examination of meat, and to adjudicate upon its fitness for food. He intended to reply to the article through the same medium if the *Medical Journal* would allow a discussion of the matter, for he thought it was reflecting great discredit on the profession generally. He proposed, "That this Society, in view of the recent revelations made in connection with the subject of meat inspection, memorialises the Government to appoint a commission to inquire into the whole question."

Mr. MACKINDER (Peterborough) seconded the proposition. He thought the way in which meat inspection was carried out was absolutely unfair. He had himself been asked to pick out bad meat where the inspector did not know which it was, and then that man had to give evidence when he (the speaker) had actually picked out the meat for him. Their inspector of nuisances had no qualification whatever for meat inspection; he hardly knew a piece of beef from mutton. They (the veterinary surgeons) had to choose which was bad meat, and yet they were said to know nothing about it. The veterinary surgeon was the only man likely to tell whether the animal had suffered from any disease or not, which was the chief consideration in all these cases. He did not think the medical profession seemed to care

much about the question, and he certainly thought that the veterinary profession should have the preference as regards meat inspection.

Mr. SMITH (Huntingdon) remarked that as a practical protest against the way in which meat inspection was carried out, in his own town he applied for the appointment himself, which of course was associated with the inspection of nuisances and of dairies and cow-sheds. He thought it was their duty as veterinary surgeons to make a protest to the authorities respecting these appointments. He pointed out that the reason why he applied for the appointment was because the inspection of meat and of the dairies and cow-sheds could only be properly carried out by a qualified veterinary surgeon. The man who was doing the work at the time was simply a retired shoemaker. The matter came before the Council, and at first he (the speaker) was appointed, but it was found out afterwards that the meeting had not been legally called, certain notices not having been given, and quite an agitation was got up by the retired shoemaker. One worthy supporter of the shoemaker gave as his reason for supporting him was that he understood the use of the lactometer. When the appointment came up for settlement there were seven votes each way, and the Mayor, who had the casting vote, gave it for the shoemaker. He was not at all sorry, for he would rather be without the appointment, as it included that of inspector of nuisances, but he thought that a practical protest should be made against the way in which the inspection of meat was carried out.

Mr. GREAVES (Manchester) said he remembered an instance in which the medical officer of health condemned a carcase as unfit for human food, and the owner of the cow called him in to inspect it and give his opinion about it. On that occasion the medical officer of health brought forward various Acts of Parliament, and made a fine show of his knowledge. He (the speaker), however, said in his evidence that the only ailment that the cow was suffering under was leanness; that she had no sickness, and that the meat was quite fit for human food. One of the magistrates said he entirely agreed with the opinion; the cow was old and lean. He remembered a case where a cow had been working in the fields for twenty years, and was as lean and poor as could be; that cow was killed, and he had the pleasure of eating a steak off her as tender as any he had eaten in his life. The case was dismissed, the Bench being unanimously in favour of the opinion that the beef was quite fit for human food. That proved the medical officer of health was not always right.

The resolution, which had been proposed by Mr. DICKENSON and seconded by Mr. MACKINDER, was carried unanimously.

Mr. GREAVES then read the following paper on

LAMENESS IN HORSES.

It is my intention, he said, to refer to some of the multifarious causes and phases of lameness in the horse, more especially obscure cases, which are more frequently seen than satisfactorily understood, the seat of lameness being often difficult to find out and to diagnose to our own satisfaction. We all of us meet such cases at one time or another, and it cannot but be interesting and useful to us all to discuss them, and become more familiar with their various phases.

No man was ever so completely skilled in our profession as not to receive new information from age and experience, inasmuch as we sometimes find ourselves really ignorant of what we thought we understood, and see cause to reject opinions and theories we had hitherto considered sound.

I purpose to take a general survey of the subject, and with this view I shall bring before you a variety of instances of lameness arising from abstruse

causes; and by directing your attention to these cases we may gain knowledge which must be of benefit to us in our daily life. Some of these cases we can discuss, and also apply ourselves to cases more familiar to us all; and if some useful facts can be gleaned my great desire will be attained.

Percivall, in his "Hippopathology," says, "An observant practitioner will often be able to derive a good deal of information concerning the locality or seat of lameness as the horse stands before him. He sets about inspecting the lame limb and examining it in every part with his hand. Some lamenesses are perceptible to the eye, and discernible by the eye better than by the hand; others are detectable by the hand alone; while, again, there are others that elude detection by either eye or hand, and which can be judged by the action, aided by the horse's manner of standing. A quick eye, judging from the general appearance of a lame horse and from his mode of going, even in the absence of any manifest disease or defect to account for the lameness, will very often discover at once the seat and nature of the lameness."

In 1842, in the Transactions of the Veterinary Medical Association, at page 52, an interesting case is related by Mr. J. Batchelder. This horse would be going sound, but a few minutes' exercise would make him at any and at all times very lame. He was blistered a great many times, fired four times, and also unnerved, all to no purpose. He had fifteen months' rest in a loose box, got sound; he was again conditioned for hunting, when he became lame again. In this case there was observed an artery taking a spiral course over the posterior part of the tendo-perforans in company with the communicating nerve; this vessel could be seen at many yards to pulsate inordinately after exertion; the pressure of this vessel upon the tendon had produced a groove on it. The horse was cast, the artery was obliterated by placing a ligature on both ends of it, and in a short time the horse went quite sound, was regularly hunted two seasons, and the lameness did not return.

In 1847 (*Veterinarian*, page 74) Mr. Gabriel relates a case of lameness in the near fore leg. Blistering, setons, etc., to shoulder were tried, and rest for four months, without the least benefit. He was considered incurable, and was destroyed. Autopsy showed every part of the limb perfectly healthy, but the liver was only half its natural size, much increased in density, and studded throughout with small cartilaginous bodies, which he called asteroides; these bodies were osseous or cartilaginous in their nature, and were, no doubt, the cause of the lameness.

In 1859 (*Veterinarian*, page 591) an interesting case of intermittent lameness in man is related, caused by obliteration of the iliac artery. The patient was fifty-four years old. When he walked for a quarter of an hour he felt in the whole of his right leg a weakness, accompanied with a numbness; if he continued his walk dull pains with prickling sensation were felt in the thigh, leg, and foot, followed by cramp and stiffness of the leg, which he was unable to move. A short rest, and these symptoms would entirely disappear. These attacks would recur five or six times in an hour, but never when in repose, seated, or stationary. Locomotion alone would always excite a recurrence of the paralytic attack; this was followed by great prostration, ultimately by vomiting blood, syncope, and death. It was then found that a tumour completely obliterated the iliac artery.

Several cases are given in French works of lameness in horses, caused by obliteration of the aorta and iliac arteries.

I have brought this case forward because the patient could speak for himself and enlighten us as to what our patients feel and suffer.

In 1889 (*Veterinary Record*, page 366) are described three or four very interesting cases of lameness by Mr. Harold Leeney. The cause or nature

of the lameness was unknown; some of them were lame thirteen or fourteen months, others three years, had various treatment in vain, but by exercise and work the lameness subsided. The writer remarks, "There is little doubt in my mind that others have had the credit of curing lameness, as well as illness, which they have never diagnosed at all."

In 1889 (*Veterinary Record*, p. 12) an obscure case of lameness, so well described by Professor F. Smith, is both instructive and useful. A horse lame, at times very lame, for one year and three-quarters, cause and nature never known; he ultimately recovered. I have seen precisely similar cases; after every means had been employed without success, they have ultimately recovered; had these cases died and been carefully examined, they would, in all probability, have been found to be cases of embolism and pressure on the nerves.

In 1888 (*Veterinary Record*, page 146) is a well-described case of embolism. The horse was sound, fell suddenly lame whilst drawing a brougham six miles; he was so lame that he had to be left in a stable near. He had rest, fomentation, etc, and in a few days he could come out of the stable sound, but could be rendered intensely lame by only a few minutes' fast trotting. This occurred again and again; the lameness was always of the same nature; *coldness of the leg* was the most noticeable feature; he would walk on his toe, and at each step his fetlock would knuckle over; he would stand with his leg raised two inches from the ground, would keep lifting it slightly but frequently, as if in great pain. On examination per rectum, it was found there was no pulsation of the iliac artery on the left or affected side; in this case there was no doubt that plugging of the iliac artery existed, and that it was the cause of lameness.

In 1863 (*Veterinary Review*, page 656) is recorded a case of intermittent lameness, caused by obliteration of arteries; it was an entire omnibus horse, aged eighteen years; he fell down in his work, was unable to rise, or even to move his fore limbs; after a short time he got up and was being led home, but before he had gone fifteen paces lameness showed itself again, and in less than ten minutes his fore limbs trembled violently, became very unsteady, convulsive movement took place in his head and neck, his breathing was laborious, beats of his heart tumultuous, and the animal restless, the expression of his countenance haggard, skin bathed in perspiration, two fore limbs dry, and skin of his limbs *cold*. In half an hour all these symptoms would entirely disappear, but again and again they would come on. He was put to work for a time, and ultimately died; it was then found that the two axillary trunks were filled with hard resistant clots which were firmly adherent to the arterial walls; the muscles of the limb were not blanched, and presented nothing worthy of note, and the nerves were the same.

In 1875 (*Veterinarian*, page 76) Mr. W. C. Ison read an account of a very interesting and useful case of lameness caused by embolism of the iliac artery, before the Midland Veterinary Medical Association. It was a seven-year old bay entire horse; he fell lame in his hind quarters in a strange manner during the last two occasions of his being exercised; the symptoms were great pain and distress; presently these would subside, and he would go quite sound. He could trot, canter, and gallop, then would come on loss of power in his hind limbs, profuse perspiration over his whole body, except his hind quarters, which were *cold* and dry. He knuckled over in his hind fetlock joint, and in the end he died. The iliac arteries were completely plugged with lymph, and the muscles were of a clay colour.

In 1889 (*Veterinary Record*, page 464) Mr. H. Gray relates a very interesting case of embolism in a cart mare five years old. This mare was harnessed in a van, and had not proceeded 100 yards before she fell lame on her off hind limb, the lameness becoming worse after going a few yards farther;

also there were profuse perspiration, roaring, and dyspnœa; the dyspnœa lasted about two hours after resting the mare. After resting six hours, she was trotted fifteen minutes before lameness again showed itself. This mare knuckled over at the fetlocks, the limbs became rigid, neither hock nor fetlock being flexed or extended, occasionally dragging the leg like a piece of wood, and the leg became *icy cold*. She evinced pain on the aorta and iliac vessels being pressed per rectum. The right iliac artery was hard and pulseless. This kind of lameness is not very uncommon; it is sometimes called "kidney dropped," "chinked in the back," "bobby backed," "broken backed," etc., etc.

In 1888 (VETERINARY JOURNAL, p. 319), again, we have another interesting case recorded by Mr. H. Gray, a nag horse, nine years old, lame on his near hind limb. This horse was bought in January, worked regularly up to June, when he became lame; he was fired on both hocks and turned out to grass; in a fortnight he could gallop and was not at all lame, worked well until September, when being driven a short distance, he lost control over his hind quarters, had colicky pains, was in a state of profuse perspiration, trembling, knuckling over on his hind fetlock, back arched, groaning with pain, eyes almost starting out of their sockets. These symptoms subsided, and he was put to work; in a week's time colicky pains came on again; this time he rested a week, was then led a few yards, when he suddenly became lame on his off hind leg, the opposite one to the one affected before. He now would catch the limb spasmodically, as in Stringhalt. The pulse at the aorta and external iliacs was feeble, and on manipulation a non-resistant body was recognisable; the external iliac was obliterated and solid; hind limb cold *off hind icy cold* and paralysed. A *post-mortem* examination proved the correctness of the diagnosis during life. These cases of lameness are not so rare as some would have us believe.

1889. In the *Veterinary Record* for 1889 (page 464) there are related several very good cases of lameness by Mr. Wm. Anderson, of Glasgow, strongly resembling, if not identical with, thrombus or embolism, that is, pressure upon certain nerves and interference in the circulation of the blood to the limbs.

1889. In the *Veterinary Record* (page 398) are several deeply interesting cases of lameness by Mr. Wm. Willis, some of them undoubted cases of thrombosis or embolism.

1889. In the *Veterinary Record* (page 433) see cases of Paralysis, simulating, if not identical with, thrombosis or embolism.

1889. In the *Veterinary Record* (page 26) is a most instructive and valuable case of Azoturia, by Mr. Arthur New. This disease is always attended with sudden lameness, loss of power in the hind extremities, profuse perspiration, and intense suffering. It is a deeply interesting subject to study. Although there has been much controversy on it of late, it is not yet clear what it is. Hereafter, as intellectual development advances, it may be found to arise from a species of embolism and pressure upon certain nerves.

1863. In the *Veterinarian* (page 601) Mr. C. Dickins, of Kimbolton, writes on joint lameness in colts, attributable to lumbricoid worms. He says, "I do not recollect seeing an adult horse affected." He relates a case of a colt three months old, very lame on his off hind pastern, increased heat, and very sensitive to the touch. In a few days he appeared all right, but in about a week there was extreme swelling, with pain and heat over the head of the femur of the same limb; this subsided, but after a while only to recur. This happened over and over again. In a little time a swelling with pain was manifest on the point of the left shoulder, on the opposite side from where he was lame. In a few days he was convalescent again; then he was attacked with gastric pains, from which he died. A *post-mortem* examination showed

the duodenum completely plugged with lumbrici. He calls this a puzzling lameness, and such cases are often symptomatic.

In conclusion, I beg to say that during fifty-five years in my profession I have met with a fair share of these interesting, though oftentimes unsatisfactory cases. The predominating pathognomonic symptoms I have found are suddenness of attack, intense pain, profuse perspiration, knuckling over on the hind fetlocks, and as the disease progresses the affected limb becomes *deadly cold* and helpless. We know of no treatment or medicine that can dissolve or remove the clots or renew the liver. My treatment has usually been hot rugs to the loins, hot salt in bags to loins, cathartics, and rest. Sometimes I have bled, with much advantage. Such treatment has been attended with varied results. I have omitted to go into every-day cases of lameness, finding sufficient matter in these cases, cases written by experienced and eminent men, who are entitled to our utmost respect. They have recorded them solely for the benefit of our profession. I say all honour to them and to all such workers; they are the redeeming feature in our otherwise apathetic profession.

I have written this paper during stolen moments from an active life. Life at best is but a fragment. The ablest and strongest amongst us cannot always use our opportunities as we would. We may have prepared the way for others to sow the seed and reap fruit from the ground we have ploughed and prepared for them. The promised land in our noble profession is not yet gained; it seems very visionary. There are a good many difficulties surrounding the pathway. Numerous deserts will have to be travelled and Red Seas crossed before our profession arrives in the land of Canaan.

The paper was received with applause, and the following discussion ensued:—

Captain Russell said he had listened with very great pleasure to Mr. Greaves's paper on obscure lameness, and all would agree such cases were very difficult to manage. They all met with cases of lameness that puzzled them for weeks, or it might be for months, and especially was this so with intermittent lameness. He had a horse lately that was sound for three weeks or a month, and then for one or two days in the interval was so lame he thought it was putting up a splint. He felt satisfied the lameness was in the foot, and examined it, but found nothing. He had it poulticed, and gave the horse some physic; after poulticing two or three days it was something better, but afterwards fell as bad as ever again. He pared the foot quite near enough for him, but could find nothing. The lameness then seemed to disappear, and the horse went to light work, but after a week was as bad as ever. Feeling sure there was something in the foot, he took the horse to the village smithy, and had the foot pared between the frog and the bar until blood was drawn, but nothing could be seen. He took him home and poulticed him. Afterwards he was pottering about with a knife, and suddenly struck something hard. What's this, he thought? when out shot what he thought to be a stone, but what afterwards proved to be a bony tumour. It came out like a filbert out of its shell. There was a fibrous skin to the tumour surrounding the true growth. The wound healed. The horse was shod, and went to work apparently perfectly sound. The contraction caused by the tumour caused the horse to go lame. (Capt. Russell here exhibited the tumour.) Continuing, he remarked that as the science of surgery improved cases of obscure lameness became more rare. He thought, as he heard some of the reports given in Mr. Greaves's paper, that some which formerly were thought obscure would now be detected by any veterinary surgeon of twelve months' standing, Cases had been mentioned where horses underwent treatment for twenty-one months. Long before that time had passed their clients would now send for somebody else.

The detection of lameness could not be taught. Some people seemed to have an innate power of discovering at a minute's notice where a horse was lame. He had heard speak of a man who could shut his eyes and tell by the sound of a horse's trot where he was lame. He could not himself do that, but if he could not detect the lameness in the horse going down and coming back he could not trust himself to do it that day, but saw the horse the next day.

Mr. DICKENSON (Boston) then related a case which years ago was submitted for his father's opinion. The horse had been in the neighbourhood for years, and had changed hands again and again. While the horse's lameness was under discussion he turned ill of the Colic, and died. The speaker made a *post-mortem* examination of the shoulder to find the cause of the lameness, and could find nothing, until at last he cut through a fibrous substance. Then he found that the horse had three fractured ribs under the scapula, and bony spicules had been thrown out, causing the growth of fibrous tissue around. These spicules pricked the shoulder every time it lifted its leg. It was almost an impossibility to elevate the shoulder, which was mechanically fixed. In another case, where a grey horse presented symptoms of shoulder lameness, he stood in the stable as if he had fractured the radius or humerus. Afterwards he was surprised to find a festered corn. After the corn was removed and the shoulder fomented the horse still remained with a fixed shoulder. He believed the corn was the exciting cause of Melanosis, the horse being predisposed to the ailment. The speaker mentioned that he had a specimen outside in the yard, which he wished the members of the Society to inspect.

Mr. MACKINDER (Peterborough) related a case in which a lady rode a horse hunting, and after a hard day's riding stopped at a gentleman's house for a short time. When she went in the horse was apparently sound; when she came out he was dead lame, and could not put his foot to the ground. There was no heat or swelling, and nothing to be seen. And so he remained, at one time apparently sound, and at another time as though he had broken his leg.

Mr. GRESSWELL (Peterborough) then gave an instance of obscure lameness in a grey horse that had been under his care. When he arrived to see the horse he was apparently as sound as could be, with the exception of the near hind leg. The owner thought he had over-pulled himself; he had been lame two or three times during the previous fortnight. He told the owner to send for him immediately he fell lame again. Three weeks afterwards the horse again fell lame, this time in the near fore leg and off hind leg, and he came to the conclusion that the horse was suffering from melanotic tumour either of the liver or of some internal organ. A slight aperient was given, and next day the animal seemed better, and the near foreleg was then quite sound; afterwards the horse died. A *post-mortem* was made, and the liver was found to be about eight stone in weight, with melanotic tumour. A fortnight ago he was sent for to see a horse lame on the near hind leg. The blacksmith had taken off the wrong shoe; the horse was lame in the off hind leg. He got better and went to work. That very morning the horse had been brought to him lame, of the near hind leg, with no heat of the foot or anything of the kind. He had not the least doubt it was melanotic tumour forming in the liver.

Mr. F. L. GOOCH (Stamford) said a client of his bought a horse which had broken down in the flexor tendons of his near fore leg, to take him backwards and forwards to work. One day the horse came home lame in the off fore leg, and he (the speaker) found the fetlock joint swollen to an enormous extent, double the size it ought to be. The owner said he had noticed the horse stumble two or three times, and he had very likely trod on a stone. The

swelling was reduced by fomentation, and whilst fastened up he got his leg fixed over his chain. He blistered the fetlock joint, and then found the horse certainly exhibited shoulder lameness. He treated him for shoulder lameness, but he did not go on very satisfactorily, and another vet. was called in, who said it was certainly a case of foot lameness, and a third who was called in said it as certainly was shoulder lameness. The horse was sold to a farmer, put to a horse, and is in foal and apparently as sound as can be. His father in his practice bought a six-year-old horse that turned lame, and nothing could be detected. It was fired in the hock, got better, and went to work for twenty years after being fired, when it threw up an enormous spavin.

Mr. SMITH (Huntingdon) told of a case that was lame in the shoulder, sometimes better and sometimes worse for three months. One night they found him with a broken leg. The man said he saw him playing in the stable and then found him lame. The speaker was convinced there was a fracture of the os corona. He shot the horse, made a *post mortem*, and found no disease at all, but the os corona broken into eight pieces.

The PRESIDENT (Mr. Freer) remarked that an excellent paper had brought about a good discussion. Adverting to embolism, he said they, as country practitioners, were not as likely to see cases as were men in towns; and it happened, maybe, two or three times in the course of a lifetime. In diagnosing embolism a great assistance was examination per rectum, then you could make no mistake—the condition of coldness, and the sudden manner in which the lameness comes on. He had a remarkable case of liver lameness. The horse was lame four or five years, and the liver filled a good-sized wheelbarrow after his death. In the case of a four-year-old horse bought at Tattersall's, he was ridden twice, and then went unmistakably lame and could hardly get round his box. The lameness was undoubtedly in the shoulder. The shoulder was fomented, a high-heeled shoe put on, and gradually he got better up to a certain point, but never could get beyond that. He was turned out to grow better, but afterwards went lamer than ever, and was shot. An examination disclosed three holes in the flexor brachii, the head of the bones being completely rotten.

Mr. GOOCH then mentioned a case in which a boy shied a stone and hit the front of the tibia of a horse. He worked for two months, then going home at a jog trot, the tibia smashed into a hundred pieces.

Mr. SMITH mentioned a case of fractured femur, where a horse worked three weeks before separation took place.

Mr. RUDKIN (Grantham) gave an instance of a horse scarcely lame at all, which was turned out, and it was found two days afterwards that the radius was fractured.

Mr. GREAVES added that he had known several instances where a horse had worked two or three days before bones that had been fractured had become separated; he supposed that was owing to the strength of the membranes that hold the bones in their place. He thought they ought not, therefore, to run any risk by allowing horses to work before a fortnight had passed in any serious case.

This closed the discussion, and the meeting closed with votes of thanks to Mr. Greaves and to Mr. Freer for their papers. The members then dined together.

F. L. GOOCH, *Hon. Sec.*

SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

A MEETING of the above Society was held in the London Hotel, Edinburgh, on June 26th, the President (C. Cunningham, Esq., M.R.C.V.S., Slateford) in the chair.

The attendance was excellent, and included, among others, Messrs. Hutton, Kelso; Robinson, Jun., Greenock; Pottie, Paisley; Durkie, Dundee; Spreull, Dundee; Brown, West Calder; Lawson, Falkirk; Gillespie, A.V.D., 15th Hussars; Aitken, Edinburgh; Anderson, Glasgow; Aitken, Dalkeith; Peddie, Glasgow; Inglis, Portobello; Robb, Jun., Glasgow; Wilson, Mendota, U.S.A.; Borthwick, Kirkleston; McDougall, Helensburgh; Clark, Coupar Angus; Black, Howgate; Young, Mid Calder; Connachie, Selkirk; the usual press representatives, and the Secretary.

The minutes of last meeting having been read and confirmed, the following gentlemen were unanimously elected to membership: Mr. T. Connachie, M.R.C.V.S., Galashiels; Mr. T. Kay, M.R.C.V.S., Lochee; Mr. A. Love, M.R.C.V.S., Leith.

Apologies for non-attendance were received and intimated from Messrs. Campbell, McIntosh-Bell, Thompson, Professor McCall, and others.

The meeting considered the motion given notice of at the annual meeting by Professor W. O. Williams, to the effect that the Society, believing that Tuberculosis is a contagious disease, urge upon the Government—1st, to stop the sale of milk of animals suspected of being affected by Tuberculosis; 2nd, to suppress the consumption of meat from tuberculosed animals; and 3rd, to give compensation for a limited number of years.

Mr. R. RUTHERFORD, the Secretary, thought that before memorialising the Government they ought to know upon what grounds they were to do so.

Mr. SPREULL, Dundee, considered the purport of the motion was to impress upon the Government the necessity of adding Tuberculosis to the list of diseases coming under the Contagious Diseases Act. He did not think there was any other way of dealing with it. The meeting then debated whether Tuberculosis was hurtful to flocks and man.

Mr. POTTIE, Paisley, said he was not inclined to go the length of saying the disease was a contagious one, and he could not see how they could stamp out a hereditary disease by any Act. He had a paper showing the returns of the Renfrew Insurance Association, where a distinct record of the yearly disease from Tuberculosis was given. Out of 1,900 cattle insured there were about thirty deaths annually, and he found that that was an average number. It was not like Pleuro-pneumonia, where in one year they might have no deaths and another year fifty. Subsequently he said that if the disease was put under the Act it would cost the county of Renfrew £1,000 to pay for its stamping out. It was quite impossible to reduce the number of deaths, although they put it under the Contagious Diseases Act, and to stop the sale of the animals would be an extreme punishment.

Mr. ANDERSON, Glasgow, said he believed that, at a certain stage, the disease was a highly infectious one, but he would not go into the question of the milk or meat consumption. He was a superintendent under the Contagious Diseases Act, and he assured them that at least 25 per cent. of the cases of Tuberculosis, in and around Glasgow, were perfectly agonising to witness. He strongly entertained the idea that the Government should introduce the disease into the Act, so as to prevent its spread in the bovine species. He held that that point should be discussed before the milk question was touched upon.

Mr. ROBINSON, Greenock, also maintained that it was an infectious disease, and that it could be stamped out in twelve months if it were placed in the Diseases Act. He recommended that milk in all cases be boiled for five minutes before consumption, and that no meat be allowed to enter the market.

Mr. SPREULL said the disease was highly communicable from parent to offspring, but he did not think it was clearly proved that the meat had the power of communicating the disease to the human subject.

Professor WILLIAMS shortly spoke to his motion, and held that neither the milk nor the meat could be used.

Mr. ANDERSON, Glasgow, said he would pass as fit for food the meat and milk of an animal only locally affected with Tuberculosis, as the bacilli might be removed. To condemn such flesh as had been recently condemned in Glasgow would be the height of absurdity. He explained that local Tuberculosis was where the disease was in a quiescent state.

Mr. CONNACHIE, Selkirk, said he would schedule the disease under the Contagious Diseases Act, even to the exclusion of Pleuro-pneumonia, as it was both hereditary and contagious.

Mr. RUTHERFORD said that the disease was increasing and called for suppression. No matter how simple the form of the disease, it was identical with the most disgusting form. So far as meat and milk were concerned, he said that it would be difficult to draw the line.

Mr. ANDERSON contended that in the case of young cows slightly attacked with Tuberculosis, the disease might be arrested if the animals were put out to grass in the spring-time.

After some further discussion, the motion to memorialise the Government was carried in the following amended form: "1st, to stop the sale of milk from tuberculosed animals; 2nd, that only veterinary surgeons be employed as meat inspectors, and that they decide what flesh should be passed as fit for food; and 3rd, to give compensation for animals condemned as being affected with Tuberculosis, such compensation to be given for a few years."

The following gentlemen were appointed a committee to draw up the memorial: Professor Williams, Professor W. O. Williams, Messrs. Cunningham, Robinson, Storrie, Spreull, Connachie, and the Secretary.

The discussion of Mr. H. Thompson's paper on "Difficult Parturition" was held over till next meeting.

Mr. POTTIE, M.R.C.V.S., Paisley, exhibited his truss apparatus for the reduction of "Scrotal Hernia," described the method of its application, and gave details of several cases illustrative of his contention, viz., that by "the introduction of this truss he had given to the profession a most certain and simple method of dealing with this lesion," the treatment of which had formerly, according to his experience, been very unsatisfactory.

Mr. HATTON'S (of Kelso) paper on "The Use and Abuse of Cake as a Feeding Stuff for Cattle and Sheep" was also, for want of time, held over till next meeting, about the middle of November.

Votes of thanks were awarded Mr. Pottie and the Chairman.

R. RUTHERFORD, F.R.C.V.S.,

Edinburgh, *September 8th*, 1889. *Hon. Sec.*

THE MIDLAND COUNTIES VETERINARY MEDICAL ASSOCIATION.

AT the quarterly meeting of this Association held at the George Hotel, Rugby, August 20th, Mr. E. Beddard, of Wolverhampton, presided, and there were also present:—

Mr. A. Goodall, Melton; Mr. B. Freer, Uppingham; Mr. Gooch, Stamford; Mr. H. T. Merrick, Northampton; Mr. Bainbridge, Wellingboro'; Mr. Barling, jun., Ross; Mr. Cole, Hinckley; Mr. H. Olver, Tamworth; Mr. R. Verney, Stratford; Mr. Wartnaby, Burton-on-Trent; Mr. R. C. Trigger, Newcastle; Mr. Wragge, London; Mr. J. Wiggins, Market Harboro'; Mr. A. Over, Rugby; Mr. J. S. Barber, Rugby; Mr. C. W. Crofts, Rugby; Mr. Avis, Wellingboro'; Capt. Russell, Grantham; Mr. F. B. Jones, Leicester; Mr. G. M. Parker, Leicester; Mr. H. Stanley, Birmingham; and Mr. J. Malcolm, Birmingham, Hon. Sec.

The meeting considered the appointment of a committee to examine the horses operated upon for roaring by Professor Axe.

The PRESIDENT said the operation was an important one, and he thought it would be desirable for each case to be reported upon properly and officially. Therefore he thought it would be best to appoint a committee.

Capt. RUSSELL suggested that the report should be made with as little delay as possible for the information of the members; and he asked whether it was proposed to report upon the present condition, or upon the alteration which had taken place from their original condition?

The PRESIDENT replied that as far as lay in their power—both.

Mr. TRIGGER moved that a committee of five be appointed. Mr. MALCOLM seconded. The resolution was put and carried.

The Committee was agreed to as follows:—The President, Mr. Jones, Mr. Over, Mr. Cartwright, Mr. Trigger.

On the suggestion of the President, the Secretary was instructed to write to Prof. Axe and invite him to be present.

On the question of revising the rules of the Association, Mr. WRAGGE moved that the rules be referred to a committee of five, viz., the President, the Hon Secretary, Mr. Parker, Mr. Trigger, and Mr. Stanley, and that they submit the revision to the next meeting.

Mr. FREER suggested that, as many members had to go away from the meeting without refreshing themselves and enjoying a social chat afterwards, it would be as well if they followed the example of the Lancashire Association and hold their meetings at 12.30, and have dinner at 2.30 or 3 o'clock. The meeting should finish at all events an hour earlier than put down in the revised rules.

Mr. GOODALL, supporting that suggestion, said there was often more practical discussion over the dinner-table than at the meeting.

Mr. TRIGGER said they must leave all that in the hands of the Committee.

Mr. Wragg's proposition was then adopted.

Mr. WRAGG suggested that the report of the Committee should be printed and circulated among the members before the meeting takes place.

This was agreed to.

The SECRETARY read letters of apology from Professors Walley, Williams, Axe, Penberthy; Sir H. Simpson; Messrs. Wilson, Kidd, Wolstenholme, Lodge, Blakeway, Leather, Perrins, Carless, Barling, Cartwright, Pritchard, etc.

He also read the following letter from Professor Walley:—

Royal Dick Veterinary College,
8, Clyde Street, Edinburgh,
August 14th, 1889.

DEAR SIR,—

I am in receipt of your invitation to the meeting of the M.C.V.M.A., to be held on the 20th current, and need scarcely say that had I been able I should have felt the greatest pleasure in accepting it.

I am very anxious that the profession should make a firm stand *in re* the "Inspection of Meat," and the inclusion of Tuberculosis in the list of contagious diseases, and in no way can this stand be better made than by resolutions adopted at the different meetings of associations.

I asked Mr. Banham to request the President to propose a motion to the National Association *in re* Inspection of Meat, but as I did not give time for notice the request was not complied with.

The two motions I would like to have carried are (1) That Tuberculosis (with certain modifications to be determined by the Privy Council) ought to be included in the Contagious Diseases (Animals) Act; (2) That the meeting

(of the association) memorialise the Government to appoint a special (or Royal) Commission to inquire into the whole question of Inspection of Meat in Great Britain.

Wishing you a happy and a good meeting,

Yours very truly, THOMAS WALLEY.

John Malcolm, Esq.

Mr. TRIGGER said they had such a resolution on the books, passed at the Stafford meeting.

The SECRETARY said there was no resolution that it should be forwarded anywhere.

Mr. STANLEY proposed that the resolution as passed be forwarded in the proper manner.

Capt. RUSSELL: With such addenda as will comply with the letter.

Mr. TRIGGER said they were out of order. They could not do anything with regard to a resolution passed at the last meeting without notice. He therefore proposed that the resolution appear on the agenda for the next meeting.

Mr. MERRICK seconded, and it was carried.

A letter from Professor Williams was read offering his testimony as to the value of the operation for Roaring.

The following members exhibited pathological specimens:—

Mr. A. OVER: An abortion after eight weeks' service, showing that after a few weeks a mare may abort, and the fœtus be swallowed by fowls or dogs and not be seen.

Mr. VERNEY showed a testicle taken from a horse rising three years old. It did well under the operation and was perfectly quiet. The testicle used to come down occasionally and go back and could not be found, until he caught it "on the hop" one morning, cast the horse and took it away.

Mr. TRIGGER then proposed that Professor Penberthy be elected an Honorary Associate of this Association.

Mr. MERRICK seconded the resolution.

The PRESIDENT then put it to the meeting, and Professor Penberthy was unanimously elected.

On the proposition of Mr. STANLEY, seconded by Mr. TRIGGER, Derby was chosen as the place for the next meeting.

A vote of thanks to the President by Mr. OLVER and seconded by Mr. STANLEY, and carried by acclamation, terminated the proceedings.

The members afterwards dined together as usual.

Mr. MERRICK read the following paper:—

A RECENT OUTBREAK OF ANTHRAX.

In a few remarks I purpose making to you, I do not intend giving a minute description or history of the fatal disease, Anthrax or Splenic Apoplexy, for most of us, especially if we be country practitioners, are only too familiar with its character. It is simply my intention to give as clear an account as lies in my power of what has been to me a very interesting outbreak of the disease, and I hope in the discussion which follows, we may each and all gather some fragments of information which in the future may prove beneficial, not only to ourselves, but to our clients.

You are all doubtless aware that since June, 1886, Anthrax has been one of the diseases included in the schedule of the Contagious Diseases (Animals) Act, and in my opinion most properly was it so included, for the risk to the human subject while handling the carcase of an Anthrax-stricken animal is well known to us all. In my practice I have seen several instances of the danger incurred, and indeed in one case the result was fatal.

I will now proceed to give the history of this particular outbreak that in the past two years has come under my notice.

On July 26th, 1887, I was summoned to attend at Cottesbroke to examine the carcases of two bullocks found dead that morning. These animals, with fifteen others, had been for about three months lying in a field called Mickley Meadow, one field among several known as Cottesbroke pastures, the property of Sir J. Langham, and this field with three more adjoining, was then in the occupation of Mr. G. Adnitt.

The *post-mortem* examination unmistakably shewed that Anthrax was the cause of death; the spleens were much enlarged, and on being cut into, thick tarry-looking blood exuded, the heart also showed those peculiar blood-stains in the ventricles, the mucous membranes of the rumen also peeled off on being lightly scraped with a knife, and the blood on being submitted to a microscopical examination was full of the rod-like bacilli found in the blood of Anthrax-stricken animals. The carcases I had drawn into an adjoining spinney and buried with six or seven feet of earth above them, and well covered with lime.

The other beasts were at once removed by my orders to another field, and to each was given a drink consisting of Soda Hyposulph. ʒiij, Pulv. Zingib. ʒij, Pulv. Cinchona ʒi and Acid Carbolic ʒi, to be repeated in three days' time. Two days afterwards I received a telegram saying another beast had died. This I did not think it advisable to open, for all the external appearances pointed to Anthrax: froth exuding from the nostrils, and blood from the anus, and I always consider it of importance to avoid, as much as I am able, contaminating the land, particularly as in nine cases out of ten it is pasture land. It now became a serious consideration as to what was to be done with the remainder of the herd, and I was directed by the local authorities to take the temperatures of the animals still alive, with the view of sending them to be slaughtered if apparently healthy. The result was marked; in twelve the temperature was normal, 102° or less, but in the other three the thermometer registered in one case over 106°, and in the other two over 105°, and two days afterwards two of these animals were found dead, and the remainder after being isolated for fourteen days were slaughtered and sent to London.

On August 13th of the same year, Mr. T. Gossage lost one of a herd of beasts in a field a short distance away; this animal was drawn into an adjoining spinney, and there the *post-mortem* examination proved conclusively that death was due to Anthrax; the other beasts were twice drenched, and no further loss resulted. It is unnecessary for me to relate *seriatim* the further losses Mr. Adnitt incurred; sufficient to say that between July and November in the year 1887 he lost thirteen beasts, which were lying in three adjoining fields, viz.: Langlands, Mill Dykes, and Mickley Meadow, and he determined to relinquish the keeping.

It was then let to Mr. Gossage, of Creaton, who almost immediately put eight head of stock in Langlands, and on December 11th one was found lying dead; these animals, I may remark, had been in Mr. Gossage's possession six months. The fields were not stocked during the summer, but lain for hay, and no further fatalities occurred till December 1888, when one of three heifers which had been grazing in Langlands died, and most certainly the *post-mortem* revealed the presence of Anthrax. The other two beasts were removed and drenched, but a fortnight after eight more were put in this field, and on January 3rd, 1889, one of these was discovered dead. I may here mention that one of three calves, about two months old, and kept at Mr. Gossage's home farm, three miles away, died of Anthrax. It had been fed on nothing but milk and the hay got from those fields in the preceding summer. Mr. Gossage now retired from the keeping, which was taken by

Mr. W. Ashley, of Long Buckley, who grazes a large number of stock, and on April 28th one of fifty-eight beasts lying in Mill Dykes was found dead. The remaining fifty-seven were moved into an adjoining field, and this, like all the other carcases of animals that had died of Anthrax, was carefully moved and buried in an adjoining spinney. On May 8th one out of twelve died in Mickley Meadow, and another on the twelfth of the same month.

Matters having now become very serious alike for owners and occupiers of the land—nearly a score of beasts having died in less than eighteen months, and no doubt many more would have succumbed if the land had been stocked the whole time—Mr. E. K. Fisher, the agent of the estate, requested the services of Professor Penberthy to inquire into the nature and cause of the outbreak. He attended on May 22nd in this year, and I met him. He made an exhaustive inquiry as to whether there had been loss in previous years in those fields, which there is no doubt there has been. He was of opinion that the disease was undoubtedly Anthrax; that the outbreak was due to animals having either been buried or dressed in these fields; and that the best means of preventing further loss was by inoculating animals put in these fields with attenuated virus, after Pasteur's method, which it is asserted has been so successful in France. Mr. Ashley, a few days after, undertook to provide some cheap beasts to be inoculated, and Mr. Fisher, on behalf of the estate, undertook to guarantee him against any loss. On May 31st, Professor Penberthy attended, supplied with the requisite virus procured from Pasteur's laboratory in Paris, and I also attended to assist him. Fifteen animals, which had been recently purchased, were driven from a field in which Anthrax has not as yet shown itself, to an adjoining pen where twelve were inoculated. The operation is simple; the animal was nosed, and about fifteen minims of the virus in solution was injected by means of a hypodermic syringe into the loose tissue behind the elbow on the right side. Three were not subjected to the operation, with a view of, if possible, getting positive as well as negative results.

The temperature of each beast was taken before being inoculated, and in every one it proved to be perfectly normal. They were then placed in the field they came from, and twelve days afterwards, on June 11th, were again inoculated, this time on the left side, with a less attenuated virus, and after an interval of four days were turned into Langlands and Mickley Meadows, where most of the fatal cases have occurred. They showed no unfavourable symptoms of any description after either operation, and up to the time of writing no deaths have taken place; I saw these beasts last week, and they have improved vastly in appearance. One thing therefore appears certain, that the inoculatory process is not dangerous if properly performed, and in this case we have at any rate partial proof of its preventive power; but I must say I should like to have seen at least one of the uninoculated beasts succumb to an attack of Anthrax.

On May 23rd, Mr. Clark, who rents some land two miles from the valley, found a cow dead; this animal had been ailing some time, and I was quite prepared to find the cause of death due to some other disease than Anthrax; and my opinion was first confirmed, for on opening the animal I found nearly every important organ affected with Tuberculosis in an advanced stage; but on examining the spleen I found all symptoms of Anthrax present, and excessive ecchymosis around the heart. I gave it as my opinion that Anthrax was the cause of death, but to have it substantiated I sent a portion of the spleen to Professor Penberthy (whom I have to thank most heartily for his courtesy and the trouble he has taken in assisting me with his advice), and he wired to me that the blood swarmed with bacilli. Mr. Clark lost no more animals in this field, neither have there been any other cases of Anthrax in the Cottesbroke district up to date.

It may be remembered that in the spring and early summer of 1888 we had heavy rains and floods in low-lying meadows, and hay lying cut and being made was flooded, and afterwards when it was got, it was, in most instances, unfit for horses at any rate, if not for other animals. Mr. Gilby, of Spratton, had twelve beasts lying in two fields in which, so far as is known, no animals have hitherto suddenly died; they had been in his possession over nine months. Early in March he commenced feeding them on some of this hay that had been flooded, and on March 28th of the present year two were found dead. They were removed by a butcher, who at once recognised the character of the disease, and I was sent for, and again Anthrax was the cause of death. The remaining beasts were moved into another field; they were no longer given the hay, and no more cases occurred.

Mr. B. Draye, of Brampton, about this time had several cows lying in his home yards, and fed on hay that had been flooded, and in the course of a few days three died after short illness, and though the *post-mortem* appearances were not so marked as in some cases, yet there is small doubt but death arose from Anthrax.

But the most marked case I have had pointing to flooded hay producing the disease, is the following: Mr. Bull, of Brampton, bought some flooded hay, and in a fortnight after giving it to his stock he lost a horse, two bullocks, and five calves. Unfortunately, I did not see either the horse or bullocks, but as they were all apparently well at night and found dead in the morning, I think there is little doubt but that they died of Anthrax. On making an examination of the carcases of two of the calves, the last that had died, I found marked evidence of the disease, indeed, the spleens in these young things, not two months old, were as large, if not larger, than in the adult animal. They had been kept and fed on nothing but skimmed milk till four or five days before they fell, when some of this hay was given, with the result recorded: the hay was stopped, the remaining seven were turned out, and no more loss occurred.

Mr. Eydes, of Little Houghton, also had a cow die that, while lying in his yard, had been fed on flooded hay gathered from a field in which Anthrax had been present a few years ago. A sow lying in the same yard was noticed to lick up the blood exuding from the anus; three days after she appeared unwell, and when I saw her I found throat and head excessively swollen, and for some days she was able to take little, if any, nourishment; but eventually she recovered, and pigged a fortnight later, all the litter being alive and healthy.

Lately, I am glad to say, in our district we have been freer from this disease; for though of course isolated cases occur, the worse affected districts have escaped. And here I may remark that I often think it would have been as well if the old term Splenic Apoplexy had been retained; for in Anthrax farmers do not recognise their old enemy, but often speak to me of it as quite a new disease; whereas it is, as we know, of very ancient origin: some even asserting that the plague of boils on man and beast with which the Egyptians were punished, and which is spoken of as "a breaking forth of blains upon man and beast throughout all the land of Egypt" was due to Anthrax.

With regard to the flooded hay producing Anthrax, I wish to ask your opinion. Do you consider it possible for the spores of the disease to have been washed down by the flood from an infected locality and deposited on this hay? For though we have had numerous cases at Cottesbroke, none, so far as I can hear, have occurred down the valley, with the exception of those related above, which had been fed on this hay. These fields are quite four miles as the crow flies from the Cottesbroke fields. There is not the slightest doubt that fields in which animals have died of Anthrax,

and perhaps been carelessly buried or dressed, are laden with the spores of the disease; and in my opinion a spring like the one just passed, with heavy rains followed by warm weather, is most likely to be succeeded by an outbreak.

Now the main question is, What can be done to prevent the attacks of this ruinous complaint? Animals attacked are a dead loss to the owner, there being no compensation, and hoofs, horns, and hide are all bound to be buried with the rest of the carcase. Cure, as we know, is out of the question, for in ninety-nine cases out of a hundred the animal is dead and stiff when we are called in. The first thing that suggests itself is advising that pasture should be turned into arable land; but that, apart from the inconvenience in most cases, is not always in every way remedial, for in one instance that came under my notice, where turnips were grown on land on which beasts had died, the sheep fed on them were violently attacked with Anthrax. There is no doubt but that if greater care had been taken in the past in the disposal of the carcases of Anthrax-stricken animals, we should not have such frequent losses in the present day, and I am always careful to order the removal of the carcase of a suspected animal to arable land, or, better still, to some wood or spinney, if such happen to be handy. Undoubtedly the best means of disposing of affected carcases is by cremation, but I am afraid the expense that would be incurred is too serious an item. I have given the drink I mentioned early in this paper to animals among which Anthrax has appeared, but I do not place much faith in the prophylactic properties of medicine in these cases. I always advise the owner to remove the herd into another field as soon as possible, and I think this is highly important.

If, as it is asserted, inoculation with the attenuated virus has been attended with such success in France, to that process I think we must look to protect animals placed in what I term anthrax-affected fields. The protection given by the operation is stated to last at least twelve months, and that length of time is quite sufficient for the feeding of store beasts. The risk is almost *nil*, the operation simple in the extreme, and the expense certainly of little moment.

The PRESIDENT opened the discussion. He thanked Mr. Merrick for his instructive and practical paper. Strange to say, he never knew but one outbreak in the whole of his district, and it was supposed by Professor Simonds and other experts to be due to a very free dressing of bones in a raw state to the land some few years ago.

Mr. OLVER said Mr. Merrick had left very little to discuss. He could trace several cases, which showed that the transformation of pasture into arable land was not preventive of Anthrax. In one case where a number of beasts had died, the land was first put into wheat and then white turnips, which meant two years, and of the cattle fed on the turnips a number died of Anthrax. As Mr. Merrick said, cattle dying of Anthrax were too often buried in the fields in which they died, and it had been proved that the bacilli found their way into the worms and by them to the surface. How the spores existed in flooded hay was not satisfactorily explained, but there was little doubt they remained in it, and were transformed into bacilli after transmission from the animals. To show how readily disease might be passed from one animal to another—an animal died last year, it was believed of Black-leg, but no doubt it was Anthrax; it was buried in an arable field in which only sheep were allowed to run. They began to die, and microscopical examination showed the rods of Anthrax bacilli. Never before had Anthrax been known to exist in that field. He would advise that the land, if pasture, should be thickly manured with lime, which, he believed, had the power of killing most organisms, and was in every way beneficial to the

land. He was glad to hear from Mr. Merrick that Professor Penberthy's inoculation had been so far successful, and that it had not caused any mortality. It was very important to veterinary surgeons, because they could recommend with some confidence that animals should be inoculated. But he should like to see, especially in breeding districts, that this Pasteur system would render animals secure not only for one year, but for a period. As to the outbreak the President spoke of, with all respect to Professor Simonds, he very much doubted whether it arose from the free distribution of bones. They would not expect at the present day to see Anthrax bacilli produced by bones.

Mr. TRIGGER said they often could not diagnose Anthrax animals, they were generally dead when they were called in; but it was interesting to find confirmation of the value of their little pocket friend the thermometer. He should like to know whether, in the temperature taken of the animals, there were any indications of disease in the system. He had no doubt they got isolated cases, and as a striking example of it he mentioned an instance where he found some pigs suffering from Anthrax, and he ascertained that they had been fed on what the local farrier said was a "struck" calf. It was no doubt Anthrax, but they would never have known that it had existed if the pigs had not eaten it. It was satisfactory to hear Mr. Merrick's account of the inoculation, but he must wait a little longer before he felt perfect confidence in this protection. He did not wish to depreciate anything of an onward scientific tendency, but he did not think Mr. Merrick was out of the wood yet. They could speak with more confidence after another season had gone over the field. A weak point in the case was that none of the uninoculated animals had died of Anthrax. With regard to converting pasture into arable land, undoubtedly it was not efficacious, but it was a desirable thing to do He should like to ask Mr. Olver whether the turnips produced Anthrax if given to animals not on the land.

Mr. OLVER said they were in a shed, but soil adhered to the turnips when given to them, and it was fair to suppose that the disease was conveyed by the soil.

Mr. TRIGGER said that rather upset the theory of converting pasture into arable land.

Mr. OLVER having quoted an instance of an isolated case,

Mr. GOOCH asked Mr. Merrick whether a stream ran down the valley, with places were the animals could drink, and whether the spores were conveyed by the water as well as the hay. He mentioned a case where a horse died from Anthrax. On investigating the case he found that a cow had died suddenly of Anthrax, and had been dissected in an upper yard through which water ran from a spring to a lower yard, where there was a trough from which the horses drank. Being certain that the case was conveyed by the water, he sent a gallon to Professor Tuson, and he came to the conclusion that it contained spores and bacilli. The spring was closed, and from that day to this there had not been a case of Anthrax.

Mr. WARTNABY described a case in which he was called in to see thirteen dead fat beasts, the property of a brewer, who was under the impression that they had been poisoned. He suggested that Anthrax was the cause, and the brewer's chemist on examining the blood found Anthrax bacilli. The beasts were lying in three fields, with one common pond as a drinking place. He advised that the remaining animals should be removed, and, with the exception of one dying on the day following their removal, there was no further loss. So certain was the bailiff that the beasts died from poison, although it was clearly proved to the master that it was not the case, that eleven cheap beasts were put into the fields, and three or four of them died in the next four days. The remainder were then removed, and no

further loss took place. He (Mr. Wartnaby), believing it was the water, advised that the pond should be drained. That was done, four or five years ago, and although the fields had been since grazed with sheep, horses, and beasts, there had been no further loss. The unsatisfactory part of the business was that no explanation as to the original cause of the outbreak could be arrived at. The oldest inhabitant could not remember a similar case, and it was doubtful whether such ever occurred. He should like to know how long the spores were supposed to exist in the soil, and was there any other explanation for an outbreak of this kind? A case that occurred since, about seven or eight miles away from this place, was due to eating flooded hay which came from pitholes. It was very far-fetched to be told that many years ago beasts had been buried there, and worms had been working up the germs and had at last reached the top this year for the first time, and probably never afterwards. There had never been a case of the kind on the farm.

Mr. BAINBRIDGE quoted a case where a short-horn died of Anthrax, and he advised that the carcase should be buried. That was done, but the offal was given to the dogs, which were then attacked. Another beast died and the carcase was sold to a butcher, who ate some of it himself, but without any deleterious results. He thought it strange that these carcases should be eaten with impunity.

Mr. MERRICK: Not at all, if it is cooked.

Mr. BAINBRIDGE, continuing, said the dogs ate some, but were not attacked; and he added that a great deal of locust beans were used in feeding the beasts.

Mr. FREER, after alluding to the death of Mr. Fisher through being bitten by a fly while examining a horse which was supposed to have been poisoned, but most likely was suffering from Anthrax, referred to the ploughing up of land. In one case where an outbreak had occurred, he advised the tenant to get his landlord to turf the land first, burn the turf, mix the products of combustion with lime, and plough the mixture in deeply, let it lie for the winter, and sow what he thought best. The landlord would not allow him to do that, but said he could lay the land. It was laid for hay and mown the next year. It was an exceptionally good year, and there were no floods. The hay was carted a mile and a half away, some Norfolk beasts were wintered upon it, and unfortunately the tenant lost half of them. There had not been a case of Anthrax there before. Mr. Freer went on to say that in his district there was an infected field in which the carcases of at least forty beasts that had died of Anthrax were buried. The Welland ran by that field, but while he had never known a case on the land below it, or down stream, he had seen scores of cases above it. In his opinion, the best way was to cremate the carcase, and the next best way to bury it deeply with very large quantities of lime. This very field, during the tenancy of one man, was limed year after year, but Anthrax still existed; although not to the extent it did formerly. The last outbreak was in 1888, and the tenant was so sick of it that he grazed the field with geese, and fortunately did not have any losses.

Mr. GOODALL said there was a field in his district in which, if they put beasts for very long, they were bound to have Anthrax. It had been subject to it for the last twenty-five years, but the occupier now knew how to manage it; he did not let the beasts stop in it long enough.

Mr. BARBER asked whether carcases were buried there in the time of the Cattle Plague?

Mr. TRIGGER asked whether horses were ever attacked there?

Mr. GOODALL replied in the negative to both questions; and added that the beasts were not allowed to remain in the field longer than a month.

Mr. MALCOLM had had very little experience in Anthrax, but he remembered one case, where a two-year-old bullock was attacked upon a farm where they had never seen Anthrax before, and from that day to this there had never been another case. In such cases it was very difficult to trace the source from which the disease arose.

Mr. OLVER said one thing had not been named. It was perfectly understood that if animals suffered from Anthrax without bloody issues in any form whatever, there was no danger if they were buried at once, because atmospheric air was necessary for the development of the bacillus.

Mr. WIGGINS said he had had some little experience of Anthrax in the two districts for which he was inspector. He had often been puzzled as to the origin of outbreaks, so exceptionally opposite had the circumstances been. They should only flounder in the mire in attempting to obtain a correct history of the why and the wherefore of these outbreaks, until they knew the life-history of the fatal germ. If they considered that the agencies for the distribution of the disease were legion, they could not wonder at any eccentricity in the outbreaks. It had been said that the earth-worm contained the spores of the bacillus, and these germs had been proved to exist for years without being devitalised, certain circumstances being only necessary to render them fertile in all their destructive power. Then again the fly was a potent agent, of which they had painful instance in the case of their friend Mr. Fisher. If they had an animal suffering from disease, flies would be found all over it. They pierced the skin and poisoned their probosces, and away they went perhaps to bite some other animal, and infect it by inoculation. Then, again, the worms which contain these spores leave them in their mounds on the surface. The heat of the sun and the trampling of animals, convert them into dust, which is wafted by the wind to pastures far distant, and why then should they wonder at the eccentric distribution of the disease? He would impress upon them the necessity of seeing that the infected animals were properly and expeditiously despatched, buried not less than six feet deep, and largely accompanied with lime, two tons under and two tons at the top of it. His instructions were to use plenty of lime, and the authorities allowed an unlimited supply. Then, again, game running about, foxes marauding, men mushrooming in the morning, were probably means of distribution. They knew it was only necessary to take a filament of the frothy mucus from the nostrils, or a portion of the bloody serum, and the partridge, the hare, rabbit, or fox, or the foot of the man became fertile sources of distribution, showing the necessity of promptitude in despatching the beast and securing proper burial. Cases occurred from flooded hay, they cropped up from land converted into arable land, and he was convinced it was carried by water. As an instance of the latter, he mentioned a case where several of fifty-seven beasts in a farmyard were stricken. The water, he was told, came from the uplands, but he found that it was brought by ordinary tiles which passed close by the corner of a field where the manure from the yard was deposited. On examining the well into which it ran, it was found that there was a considerable depth of silted sewage. By his advice the well was thoroughly cleaned out, and several cart loads of unslaked lime were tipped into it, and since then—six years ago—the yard had been free from Splenic Apoplexy.

Mr. MERRICK, replying on the discussion, mentioned an instance at Beddington to show that the change of pasture into arable land was not a preventive. In these very fields at Cottesbroke this year, sheep had been dying, and they thought nothing of it. He reported it as Anthrax, but when Professor Penberthy came down, one happened to die. He said any one would call it Anthrax, but on putting the blood under the microscope there were no traces of bacilli, and he called it Braxy.

Several members said they always considered that was the same as Anthrax.

Mr. MERRICK continuing, replied to a question by Mr. Trigger as to whether there was any rise of temperature in the three animals referred to in the paper. They were just as well as any of the others—there was no difference in the hair—no turning—and no rise in the pulse. He thought very often that isolated cases of supposed Splenic Apoplexy were really Epilepsy. He had found cases where animals had died suddenly, but there was no indication of Anthrax. As to inoculation, it had been tried in France with great success—more particularly in Brittany, with sheep. There it had been successful, and there was no reason why it should not be successful here. Having related an instance where traces of arsenic were found in beasts that had died, and which was ultimately found to be in the water supply coming from some ironstone mines a considerable distance away, Mr. Merrick said there was no satisfactory information as to the life of spores, and he thought it would take a lot of finding out. First of all they had got to find out the spores.

Capt. RUSSELL.—Don't they produce themselves?

Mr. WIGGINS said if oxygen was kept from the bacillus for twelve hours it died, but the spores lived indefinitely.

Mr. MERRICK, proceeding with his remarks, said horses suffering from Anthrax certainly lived longer than cattle; he believed dogs were less susceptible than other animals to the effects of eating the meat, but he had known several dogs killed by it; and at the beginning of the season, Mr. Goodall told him his hounds were no doubt suffering from an attack of Anthrax through eating anthraxed meat. As regarded the conveying power of water, he considered it a good subject for discussion. He did not think the spores of the disease could be taken into the system from drinking, because cattle as a rule, except in a very dry season, drink very little. He did not say it was the case, but he had known instances of the disease where there was no drinking place at all. With regard to what Mr Wiggins said about worms, no doubt in a season like the present—wet and warm—they did work up to the surface, whereas in a dry season they did not.

Capt. RUSSELL moved a vote of thanks to Mr. Merrick.

Mr. WIGGINS seconded, and it was unanimously carried.

Army Veterinary Department.

Gazette, September 3rd.

Inspecting Veterinary Surgeon James Joseph Meyrick, C.B., F.R.C.V.S., to be placed on retired pay. Dated 6th September, 1889.

Veterinary Surgeon, First Class, Francis Walker, to be Inspecting Veterinary Surgeon, ranking as Lieutenant-Colonel, vice J. J. Meyrick, C.B., F.R.C.V.S. Dated 6th September, 1889.

Gazette, September 6th.

YEOMANRY CAVALRY.—Hampshire (Carabineers). Harold Leeney, gentleman, to be Veterinary Surgeon.

Gazette, September 10th.

1ST LIFE GUARDS.—Veterinary Surgeon, First Class, John Denis Edwards, to be Veterinary Surgeon, First Class, vice F. Walker, promoted. Dated 11th September, 1889.

VETERINARY DEPARTMENT.—Fitzpatrick Eassie, gentleman, to be Veterinary Surgeon on probation, in succession to Veterinary Surgeon, First Class, Francis Walker, promoted. Dated 11th September, 1889.

Gazette, September 13th.

MONTGOMERYSHIRE YEOMANRY CAVALRY.—Veterinary Surgeon D. Rowlands resigns his commission; also is permitted to retain his rank, and to continue to wear the uniform of the regiment on his retirement. Dated 14th September, 1889.

Victoria Government Gazette, July 10th.

Veterinary Surgeon W. D. Snowball, of the Mounted Rifles (Ballarat), has been promoted to be Inspecting Veterinary Surgeon of the Victorian Military Forces, with the rank of Major.

The Army Veterinary Department has sustained a heavy loss through the retirement from the service, owing to attainment of the prescribed age, of J. J. Meyrick, C.B., one of its best officers. Mr. Meyrick has earned a good name for himself throughout his long career, not only for his conscientious zeal and care in the discharge of his duties at home and abroad, but also for his genial and obliging disposition towards his brother officers. He was the first Army veterinary surgeon to receive the C.B. for his distinguished services during the Egyptian war of 1882, on which occasion the Khedive of Egypt also bestowed upon him the Order of the Osmanieh. So much was he esteemed by the officers of the department in Ireland, where he was Inspecting Veterinary Surgeon, that on his retirement they presented him with a piece of plate. He carries with him into private life the good wishes of all who knew him, and it is to be hoped that he may have many years of good health in which to enjoy his well-earned rest, after so long a period of activity.

In the last number of the Journal mention was made of the manner in which Lieutenant Beech, late of the Department, had again recently distinguished himself in Egypt. The following allusion to it is from the despatches of Major-General Greenfell, K.C.B., published in the *Gazette* of September 6th:—

"The Cavalry under Second Lieutenant J. R. Beech, C.M.G., commanding Halfa Cavalry, has throughout the operations hung on to the Dervish flanks and rear, and punished them severely. Lieutenant Beech has shown great qualities as a Cavalry leader, and in the charge both he and Lieutenant G. C. C. d'Aigular, 17th Lancers, led their men with great gallantry. His subordinate native officers behaved remarkably well."

Inspecting Veterinary Surgeon F. Walker has embarked for a tour of service in India, proceeding to Meerut, where he relieves Inspecting Veterinary Surgeon Russell, who goes to Simla as Principal Veterinary Surgeon in India.

Veterinary Surgeon Lewis has also embarked for a tour of service in India.

Obituary.

THE following deaths among members of the profession have been reported:—

J. Kirkpatrick, M.R.C.V.S., Maxweltown, N.B. ..	graduated in	1831
H. Seton, M.R.C.V.S., Edinburgh	,,	1835
G. H. Darwell, M.R.C.V.S., Northwich, Cheshire ..	,,	1847
T. C. Dobson, M.R.C.V.S., Christchurch, New Zealand	,,	1872-79
G. Ellison, M.R.C.V.S., Chorley, Lancashire	,,	1884

Notes and News.

"Vaccination" Against the Siberian Pest.—A large Russian breeder at Kaschowka has had two flocks of 8,000 sheep "vaccinated" against this disease. Two "vaccinations" by Veterinary Professor Schalaschnikow, of the Charkow University, were applied to each sheep, increasing in strength, and the results thus obtained left nothing to desire. After the first vaccination one sheep only died, and two after the second. To give more weight to the usefulness of this vaccination, it so happened that amongst the other non-vaccinated flocks of this breeder a great number of sheep succumbed to the epizoöty, which did not attack a single head of the two vaccinated flocks.

The First Days of a Lamb.—About five minutes after a lamb is born he is on his feet. The unsteady earth under him now heaves to the right, surges up and then down, and whirls and twirls with him while he staggers, struggles, and twists one leg around the other like a vine around a tree, or else he spreads those members all out until they look like the forks under a weather vane. He tumbles down for the fiftieth time, and for the fiftieth time renews the fight to secure that footing in the great world from which only can he reach the life-giving milk. His mother—particularly if it is her first—in her crazy anxiety to help, knocks him down, steps on him, and does—without leaving out a possible exception—everything she should not do, while she leaves nearly everything undone that might help the little fellow to get the desired nourishment. "Oh, the poor, dear little thing; isn't it too bad?" says the sympathetic stranger. "The confounded pair of idiots!" frets the impatient shepherd, who does not care to drive them until the lamb finds milk. In half an hour his sides bulge out; and as the shepherd slowly urges the old ewe towards home, the lamb goes reeling and rolling along like an old tar just ashore from a year's voyage. About the first error the lamb makes in life is to mistake the shepherd or his dog for its mother, and many are the manœuvres that must be gone through with to make the new arrival follow the right party. His next error is likely to be an attempt to walk on air when he comes to a place where he should go down hill. His ten minutes' experience in life has made him believe that all the earth is a level plain, and in broad daylight he steps off the top of a hill just as serenely as a man steps off the top landing of the stairs in total darkness when he is certain that the stairs are yet twenty feet away. The result is a great surprise in each instance. The lamb picks himself up, and continues down the hill; he soon comes to the conclusion that everything is down hill in his life, and not on a dead level. Upon getting to the foot of the hill, he still tries to continue downward, and as a result runs his nose into the ground, and looks surprised again. He now comes to a place to get up hill, and goes up just as our man starts to go upstairs in total darkness when he thinks the stairs are still twenty feet away. Our lamb is now getting very suspicious. He was pushed over and growled at for following the dog when he thought it was his mother; the shepherd kicked and abused him for following him; he tumbled down hill when he saw nothing unusual in the looks of the ground, and up hill again under similar circumstances. In this frame of mind he comes to a shadow cast by a neighbouring hill. This is the most appalling thing he has yet seen in life. He stands in the bright sunshine; twelve inches ahead of him all the world is black. How shall he get over that terrible line? It must be worse than going down hill or up hill, or running after a dog that growls or a man that kicks. It surely looks much more frightful than any of these things. His mother is in the shadow, and coaxes him to come along, but he will not risk it; he stands on the edge and bawls at the top of his powers. The shepherd with his big foot comes to the rescue, and our little lamb is lifted from sunlight to shadow

on the end of a No. 9 boot. He trots along after his mother for a few yards and meets a new difficulty. This time it is from shadow to sunlight. It looks rough; the situation seems to present no end of difficulties. He walks across the line with fear and trembling, only to find it very simple and easy, and concludes that things are not so bad as they look. He has already begun to find out that things which seem easy in life lead often to disaster, and forbidden things often present no real danger. At this time he is about one hour old; for a whole hour he has been running his respirative, circulative, and locomotive powers as an independent being, and has become quite a lamb. Just at that instant a carriage drives rapidly along the road. His quick eye sees it; he thinks, perhaps, it is his mother, and that she is running from danger. He strikes out after it. It is wonderful what an hour has done for him in the way of development: he runs faster than the shepherd, faster than his mother, and is in imminent danger of getting under the horses' feet or the wheels of the carriage.—*Montana Wool Grower.*

Dogs in London.—The monthly return of the Secretary of the Dogs' Home, Battersea, shows that 3,563 lost and unmuzzled dogs were taken into the home during August.

Rabies and Muzzling.—Mr. John Ferris, L.R.C.P., L.R.C.S.Ed., F.R.C.V.S.L. (Torquay), late of the Army Veterinary Department, writes, "Those who know the nature of this fearful disease will not venture to argue that in this case prevention is not better than cure. It appears, however, that the Privy Council and the London County Council were not unanimous in wishing to abolish this disease from among us. Will you be good enough to allow me to give a few reasons why muzzling of dogs should be effectually carried out throughout the kingdom? 1. Rabies is a specific disease. 2. It can only be propagated by contagion. 3. Climate, season, want of water and of food do not have any influence over it. 4. The virus is of a specific nature. 5. Rabies in the dog cannot be produced except by direct inoculation. 6. The specific virus resides mainly in the secretions furnished by the mucous membrane of the mouth. 7. It never inoculates when it is applied to the sound surface of the skin. 8. The reason so many escape Hydrophobia after being bitten by a rabid animal is the fact that they are wounded through their clothes, and the fangs are cleansed from the virus. 9. The only means of stamping this fearful malady out is by muzzling and establishing a quarantine of all dogs imported. Imagination is said to have a wonderful influence upon diseases of this kind, but we all agree that it cannot be originated unless the virus be introduced from a rabid animal. We certainly have to thank M. Pasteur for kindly undertaking the treatment of cases sent to the Pasteur Institute. Sir James Paget, when speaking at the Mansion House on July 1st as a delegate from the Royal Society, said that the meeting recorded its conviction that the efficacy of the antirabic treatment discovered by M. Pasteur is fully demonstrated. This is most satisfactory so far, but our object should be to afford protection and to do all in our power to prevent the disease, and it is simple enough to muzzle dogs, as they do not object in the least; in fact, they can be taught to fetch their muzzle. Whether a patient follows M. Pasteur's treatment or not, I maintain that whenever he has been bitten by a rabid animal or one suspected of having Rabies the wounded part should be at once excised, and the raw surface freely treated with caustic potash, nitric acid, the actual cautery, etc. I have found sucking the wound immediately and applying nitrate of silver successful treatment. I may here mention a case of a soldier in India, who was bitten on three different occasions by a rabid dog on the hands and fingers, when the above-named treatment was adopted with success. Dogs are frequently reported to be suffering from Rabies when some other disease exists; for example, I have seen Distemper in

dogs show symptoms analogous when the disease is centred in the nervous system, and this is not an infrequent occurrence."

RABIES IN AMERICA.—A horse with all the symptoms of Rabies, ran through the streets of Chicago, and bit two men and eight horses before he was shot. A rabid dog bit several cows near Plainfield, N.J., recently, and a number of them have died of Rabies.

Correspondence.

PROTECTIVE INOCULATION FOR CONTAGIOUS PLEURO-PNEUMONIA.

DEAR SIR,—I was very pleased to see by the Journal for August that you had received and published an account of the experiments conducted in Queensland, Australia, on inoculation for Pleuro-pneumonia. The experiments establish, I may be allowed to point out, what the late Mr. Graham Mitchell and myself have already pointed out, that animals may successfully be inoculated with lymph obtained from the localised external lesion of an otherwise healthy animal, inoculated with lung lymph in the first instance, and that the lymph so obtained is as potent as if taken from the lung.

I enclose you two communications which I have received, and which you might kindly publish, in support of what I have said about the opinion held by Colonial authorities on this subject.

Edinburgh. R. RUTHERFORD.

Office of Chief Inspector of Stock,
Brisbane, Queensland, *June 5th*, 1889.

SIR,—I have by this mail posted to your address a Parliamentary report of the Board appointed by the Queensland Government to assist M. Pasteur's representatives in their experiments on inoculation for Pleuro-pneumonia.

I have followed with pleasure your efforts to induce the British cattle-owners to adopt a preventive, the efficacy of which no Australian cattle-owner who has had practical experience of it would dare to deny.

Permit me to explain that on Dr. Germont's arrival here I informed him that a medical gentleman in rather extensive practice in Brisbane had for years asserted that the abnormal condition produced by inoculation was not that of true bovine Pleuro-pneumonia, nor of any modification thereof; in proof of which he cited the oft-repeated fact that inoculation in the tail did not produce the lung lesions of Pleuro-pneumonia.

Dr. Germont cheerfully accepted the challenge, and stated that he would produce the lesions of Pleuro-pneumonia by inoculating direct into the lung. Instead of that, however, he made the inoculation into the jugular vein, with the result recorded in his report. That calf died of as true a condition of bovine Pleuro-pneumonia as any of the many thousands which have come under my notice during my twenty-seven years' official experience of the disease.

I shall be glad if, when opportunity offers, you will bring this report under the notice of the veterinary profession.

P. R. GORDON,
Chief Inspector of Stock, Queensland.

Brisbane, Queensland, *July 8th*, 1889.

DEAR SIR,—I took the liberty of writing you some weeks ago on the subject of Dr. Germont's experiments on the cultivation of the virus of Pleuro-pneumonia.

I have now established three cultivation stations in this colony, one here in Brisbane under my own care, one at Rockhampton in charge of C. A. Calvert, V.S., the inspector there, and one at Townsville, 1,000 miles north

of Brisbane, at each of which lymph is continually under cultivation through the medium of calves, and tubes containing each sixteen drops sent to the cattle-owners in different parts of the colony, in cases specially made for the purpose. By this means the cattle-owners can inoculate one or two calves, from which they procure as much subcutaneons lymph as will inoculate their whole herd.

On Saturday last, the 6th instant, I killed a calf which I had inoculated on the 13th of June, behind the shoulder, with sixteen drops of virus taken from a bullock that had contracted the disease in the natural way. The œdema extended all along the side of inoculation and the belly, and also extended to the dewlap. The temperature taken immediately before slaughter was 107·4, so that the disease was in full evolution (the temperature usually falls to about 101° immediately before death). From this calf I took 160 tubes of lymph, and could have taken 1,000 if necessary. I then cut it open and bottled off about half a gallon of subcutaneous virus, which I gave to a cattle-owner, and with which he inoculated a large herd. In the connective tissue there was fully a gallon of lymph, which could have been collected and bottled by pressure with the hands.

This case was specially interesting from the fact that for several days before slaughter the breathing of the calf was very laboured, and it also had the typical cough. On opening it (after I had collected the virus in the sterilized tubes) I found the usual lesions of Pleuro-pneumonia present. The left lung was much congested and a part of it hepatized. The pleura-pulmonalis and castalis showed the usual appearances observed in a case of the disease contracted in the usual way. You will have noticed by Dr. Germont's report that he was able to produce a veritable Pleuro-pneumonia by inoculating in the jugular vein; and on two previous occasions the lung lesions have resulted from inoculation behind the shoulder.

I am thus particular in these details because the few opponents of inoculation here (and they are very few indeed) base their opposition on the supposed fact that the abnormal condition of the system produced by the operation is in no sense Pleuro-pneumonia, but Septicæmia; and in proof of their contention, they cite the fact that hitherto inoculation has failed to produce the lesions of Pleuro-pneumonia, ignoring the evidence of Willems, that the operation localises the disease. The experiments of Dr. Germont, as well as my subsequent experience, appears to me to entirely cut the ground from under their feet.

I may state that the temperature of the calf was taken at the time it was inoculated, and found to be 102°. In every instance the temperature is taken by placing the thermometer in the anus and allowing it to remain there five minutes.

If you think that any of the facts here related would prove of any service to your profession, I shall be pleased if you will give them publicity.

P. R. Gordon,
Chief Inspector of Stock.

ANIMAL TUBERCULOSIS.

Sir,—The *Lancet*, like most medical journals published in English, has a happy knack of description. It always prefers to place the cart before the horse in matters of literature. An example of this may be seen in its review of animal Tuberculosis. After alluding to the work of the International Veterinary Congress of 1883, it reminds its readers of Dr. Creighton's work, upon bovine Tuberculosis (1881), by which is implied priority of labour. True, but what kind of labour was it when Dr. Creighton held that the bovine disease had characters distinct from those of human Tuberculosis, when the *Lancet* even acknowledges that there "now appears to be overwhelming evi-

dence of the identity of the human and bovine affections"? In closing its description, the *Lancet* again precedes its remarks, for its "own part," by laying considerable stress on "the arrest and cure of tuberculous lesions," only to show in the next paragraph that these are but the teachings of our well-known veterinarian M. Nocard, whose paper is quoted, which was read before a *medical* congress. And, finally, we are "urged" by the *Lancet* to "suggest and enforce prophylactic measures whereby the bovine 'scourge' may be mitigated amongst the herds, so that it may soon come to be a rare thing for tubercular beasts to be sent to market."

"A READER."

HISTORY OF TUBERCULOSIS.

SIR,—Villemin (1865) showed the disease was communicable by inoculation to the lower animals; Chauveau (1868) found it could be induced by ingestion; Toussaint (1881) announced that the organism of Tuberculosis could be cultivated outside the body, and Koch (1882) proclaimed he had separated, by a special process, the organism, to which the name *Bacillus Tuberculosis* was afterwards applied.

Ask a medical man in England for the history of Tuberculosis, and he will say, Koch discovered the *Bacillus Tuberculosis*, and Dr. Crookshank showed it was communicable to the lower animals. Why is it so? Because it was a veterinary surgeon who first showed the principal method of communication of the disease, and it was a veterinary surgeon also who first cultivated the organism of Tuberculosis outside the body of the animal.

Moreover, ask a medical man for the method of communication of Tuberculosis, and he will answer, *inhalation*, because it was a veterinary surgeon, also, who experimentally showed it was ingestion, even more than inhalation so-called.

T. J. MITCHELL, M.R.C.V.S.

Killraugh Lodge, Thurles.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from W. D. Snowball, Ballarat, Victoria; "A Reader;" R. Rutherford, Edinburgh; F. L. Gooch, Stamford; R. W. Burke, A.V.D., Kilkenny; J. Malcolm, Birmingham; J. Brett, Notts.; A. W. Hill, London; J. Ferris, Torquay; T. J. Mitchell, Thurles; J. A. Nunn, A.V.D., Assam; R. Ward, Baltimore.

BOOKS AND PAMPHLETS: Report upon Tuberculosis and its Prevalence among the Neat Cattle of Rhode Island; Séance Publique de la Société Nationale d'Agriculture de France; Bulletin et Mémoires de la Société Centrale de Médecine Vétérinaires; Bulletin des Séances de la Société Nationale d'Agriculture de France; *G. T. Brown*, Animals of the Farm in Health and Disease; *M. Sussdorf*, Die Verteilung der Arterien und Nerven an Hand und Fuss der Haussängethiere; Monument à J. B. Van Helmont; Bulletin des Séances de la Société Nationale d'Agriculture de France; *Drs. Boschetti e Bassi*, Fleming's Trattato di Ostetrica Veterinaria.

JOURNALS, ETC.: *Quarterly Journal of Veterinary Science in India; Clinica Veterinaria; Echo Vétérinaire; Annales de Méd. Vétérinaire; Lancet; Archives Vétérinaires; Recueil de Med. Vétérinaire; Hufschmied; British Medical Journal; American Veterinary Review; Œsterreichische Zeitschrift fur Wissenschaftliche Veterinärkunde; Wochenschrift für Theirheilkunde und Viehzucht; Revue Veterinaire; Deutsche Zeitschrift fur Thiermedicin und Vergleichende Pathologie; Thierarzt; Live Stock Journal; Edinburgh Medical Journal; London Medical Record; American Live Stock Journal; Mark Lane Express.*

NEWSPAPERS: *Melbourne Daily Telegraph; North Star; Scotsman; Daily Chronicle.*

THE VETERINARY JOURNAL

AND

Annals of Comparative Pathology.

NOVEMBER, 1889.

ON CERTAIN ABNORMALITIES OF THE RECTUM OBSERVABLE IN VETERINARY PRACTICE.

BY A. E. MACGILLIVRAY, BANFF, N.B.

In country practice, rectal abnormalities are not at all infrequent, are often very alarming, and unless quickly, cautiously, and energetically treated, are by no means free from danger.

The most commonly occurring rectal derangement is what may be called *protrusion*, which, in so far as my experience goes, may be found in three forms; namely, (1) where the whole rectum is turned out, its inner end being outermost—this is called *procidented;* (2) where only the posterior half is pushed out—this is what is generally known as *prolapsus;* (3) where the anterior part becomes invaginated or cannoned into the posterior part, and appears outside the anus—this is called rectal *intussusception*.

The most serious phase is, of course, where the whole rectum is protruded. I had a case of this sort quite recently in a fine polled cow. The whole organ was turned inside out, and was outside the anus; it was very much swollen, and torn deeply in three or four places. Reduction and retention in position were accomplished as follows: bathing with warm water and soda carbonate, clearing away all torn pieces of mucous membrane, of which there were plenty, and then with the aid of an assistant cautiously but forcibly putting pressure on the extremity of the protrusion, gradually replacing it in its natural position. To retain it there I introduced three (double-buttoned) metallic sutures right across the anal opening, with their attachments fully an inch and a half away from the anus on either side, thus leaving free vent to the fæces. Before commencing to operate, I injected six grains

of morphia subcutaneously, and yet the tenesmus was so great that *prolapsus vaginæ* took place, which I reduced, and inserted one suture through the *labia vulvæ* to retain *in situ*. My patient is now all right.

During last winter I had two very interesting cases of prolapsus recti in sows; in both the prolapsus had existed for about three months, in consequence of which the protrusion was quite hard and callous. In the one sow, after much trouble, I reduced the abnormal anal appendage, and kept it in its normal position with two metallic sutures, as above. In the other the owner would not admit of operation, so the hard and callous protruded part of the rectum was allowed to dangle about outside in all sorts of weather and among all kinds of dirt, until *it fell away*, and left a pretty fair-looking anus behind, adhesion between the remaining part of gut and inside of anal opening having taken place. Such a *finale* is, I should say, rather uncommon, and certainly not to be depended on.

There is a sort of invagination or intussusception of the rectum which takes place without any *external* appearance of that viscus. I had a case of this kind some time ago in a Clydesdale mare, to which I was called late at night; the animal was in extreme agony, lying down and getting up almost constantly, sweating, etc.; there was also severe tenesmus and straining, owing, as the owner thought, to retention of urine. Examination *per vaginam* showed the fallacy of this idea; so I explored the rectum, and discovered that the anterior part of that viscus had become invaginated or rolled into the posterior portion, and would, with the severe tenesmus, no doubt in time have appeared outside. I injected five grains of morphia hypodermically, and at once proceeded to return the intussuscepted part of the rectum, which I accomplished with comparatively little trouble, and retained it in its natural position for ten minutes, by my hand in the rectum, after which it did not again return to its erratic condition.

In all cases of colic accompanied by straining, this invagination of the rectum, without external appearance, ought to be looked for, as I am certain it occurs oftener than might be expected.

I have met with two sorts of growths in the rectum, namely, a soft, ragged, and *fleshy*, and a hard, knotty, and *fibrous*. The former are generally easily got rid of by pulling outside, cutting off, and searing the base, root, or pedicle with a hot iron; the hard, knotty and fibrous tumours formed in the rectum appear to be more of a malignant nature, are more difficult to get at, and unless you can induce their destruction by thoroughly breaking them up and producing a sort of suppuration, are very apt to reappear. I had a case of this description in a pregnant heifer

last winter; the owner thought she was going to abort, as she was straining severely and almost constantly, but on cursorily examining her I discovered that there was a very slight blood-stained discharge from the anus; so I explored the rectum (instead of the vagina), and discovered a hard, knotty, broad, flat tumour in the floor of the rectum, about six or seven inches in. Having a rather powerful vaginal speculum with me, I gave the owner a good look at the *cause* of the supposed abortion, which greatly astonished him. I used very little ceremony in the breaking up and scraping away as much as possible of this tumour, and at my next visit found the remaining base of it suppurating or festering all over. Repeated applications of strongly carbolised olive oil completed the cure.

Abscesses are far from uncommon in the floor of the rectum of young stock, generally males.

I have over and over again evacuated such abscesses without their recurring, or any other bad effects. A cause for these abscesses I could never satisfactorily discover, unless in two or three cases where I afterwards found Tuberculosis crop up.

A different sort of abscesses often occurs in the rectum of cows, and sometimes in mares, resulting from injuries received during parturition; these may be evacuated either *per rectum* or *per vaginam*, as may be found most suitable or convenient; their presence is indicated by tenesmus.

Congenital rectal malformations or abnormalities are not infrequently found in foals, calves, lambs, and pigs. The rectum may be altogether absent, or it may have no posterior vent or anus, or it may have no connection anteriorly with the small colon. In either case the consequences are generally rather serious, if not fatal. No doubt the congenital occlusion of the anus may at times be permanently rectified by a very slight operation, but cases admitting of such happy results are unluckily few and far between. If the rectum be absent, or have no connection anteriorly, the case must of dire necessity prove fatal.

Recently, I have had two cases in foals in which the rectum ended anteriorly in a blind pouch. In the one case this isolated rectum was connected with the latter part of the small colon by means of a fibrous cord, about the thickness of whip-cord, of eight inches long. The small colon, where it ought to have joined or formed the rectum, ended in an immense pouch full of thin fæcal matter. In the other foal the rectum was completely isolated, and had no connection of any sort with the other intestines.

I had a very curious case last spring in a calf, in which the rectum was entirely occluded throughout its whole course, as was also the anus. With perseverance and great caution, I got the

rectum rendered pervious *without drawing blood;* but I was no better, as there still appeared to be no open connection with the small colon. The little creature died, and I then discovered that the intestine ended in a small blind pouch, with no connection, about six feet from anus. I had a similar case about a year ago, but did not get a *post-mortem* examination, so cannot fully report. My theory as to this occlusion of the rectum, *congenital rectal atresia*, is that it arises from the want of the absolutely necessary connection with the other part of the intestine anteriorly. The rectum being thoroughly isolated and quiescent, its collapsed and inactive walls become more or less firmly attached, and *atresia* follows.

I shall conclude these rambling remarks as to the rectum, by noting a rather peculiar and extraordinary state in which it is at times found. Most veterinarians are now pretty well aware of the connection between the rectum and the clinical thermometer in veterinary practice, the rectum being almost invariably the receptacle for that invaluable "aid to diagnosis." The natural temperature thus obtained in the various domesticated animals is now so well known as to need no discussion here; for instance, the natural temperature in cattle is now accepted as 102° F.; but in some rare instances we find a reliable thermometer registering as low as 97°, or even 95° F.! This brings me to what I have called an "extraordinary state" of the rectum, namely, the excessive lowering of its temperature. I had a case of this kind lately in a cow, in which the rectal temperature ran down as low as 95° F.; and even then the cow was "chewing the cud," although inappetent.

As a rule, in bovines the vaginal temperature is a shade lower than the rectal; but in the above cow the vaginal temperature ran up to 99° F.; so that the abnormally low temperature was almost entirely restricted to the rectum. I took repeated rectal observations in this cow, and even washed out the rectum several times with warm water, to make sure that my thermometer did not come in contact with any dormant fæces; but to no purpose, for the low temperature prevailed, and even the contiguous passage was always as low as 98° or 99° F. This is not an isolated case, as I have observed the same state of matters before, but have never been able to account for the abnormality. Whatever was the cause, in this cow its influence was partially felt in the vagina, where the temperature was, at the highest, three degrees below the natural. In this case the very fæces and gases passed were comparatively cold.

THE CHEMICAL COMPOSITION OF SYNOVIA, AND THE GASES FOUND IN PUS, SWEAT, AND SALIVA.

BY PROFESSOR FRED SMITH, M.R.C.V.S., F.I.C., ARMY VETERINARY SCHOOL, ALDERSHOT.

Synovia.—Through the kindness of Mr. J. Brett, M.R.C.V.S., of Nottingham, I received a bottle containing synovia, removed from the stifle joint of a foal.

The fluid was of a yellow colour, with a faint tint of red; flakes of fibrine were seen in it, probably due to the accidental presence of some blood; on beating with a rod it yielded no fibrine. The synovia was not fresh, I do not know how many days old it was, but it had a perfectly sweet and rather aromatic odour; this latter was probably due to the bottle.

Its reaction was faintly alkaline, its specific gravity 1,014.

It gave the following composition :—

Water	95·5768	Albumen	2·1429
Organic matter	3·8855	Fat ...	·0466
		Mucin ...	·0491
Salts	·5377		

The salts consisted chiefly of chlorides of sodium, sulphates, and magnesia; lime was present in traces, and potash absent.

Pus.—I collected over mercury some pus from a Strangles abscess, submitted it to the vacuum of a mercury pump, and so extracted the gases.

100 c.c. of pus yielded 26·028 c.c. of gas at 0°C. and 760 mm. Bar.*

This gas had the following composition :—

Carbonic Acid	15·6167
Oxygen	2·2023
Nitrogen	8·2090
	26·0280

I could find no combined CO_2.

The pus was perfectly fresh, and had not come in contact with the air.

Sweat.—The fluid was removed by scraping the body of a horse which was sweating profusely after a gallop; it was immediately placed over mercury to avoid any loss or change in its gases.

Submitted to the vacuum of a mercury pump, 100 c.c. of sweat yielded, at standard temperature and pressure, 38·9246 c.c. of gas.

* To those not conversant with the metrical system, read for c.c. the word "parts" or "measures."

This gas had the following composition :—

CO_2	—
O	8·1946
N	30·7300

I was most surprised to find no CO_2. In another specimen of sweat, taken from a different horse, I found a small quantity of CO_2.

Saliva (*Horse*).—The saliva was obtained by the administration of pilocarpine.

It was submitted to the vacuum of a mercury pump, and 100 c.c. of saliva yielded 41·71 c.c. of gas of the following composition :—

CO_2	1·378
O	27·490
N	12·842

We are shown by these three analyses how unequally the dissolved gases of the body are distributed—the large amount of CO_2 in pus, its absence in sweat ; the large amount of oxygen in saliva, the small amount in pus, and the large quantity of nitrogen in sweat are all interesting points from the physiologist's point of view.

A FEW NOTES ON TORSION OF THE UTERUS AND PUERPERAL FEVER.

BY C. CUNNINGHAM, V.S., SLATEFORD.

About three years ago (Feb., 1886) I ventured to insert in the Journal four cases of Torsion of the Uterus—two failures and two successfully treated—in the hope and with the wish that the details might be useful to other practitioners :—that some at least might be induced to avoid the errors committed, and by adopting the means effectively used, be enabled to deal more readily and more easily with this troublesome form of presentation.

During the present year I have had to do with two other cases, to which I may be excused referring, as they illustrate other phases of the subject—tending to show still further the good effect of "rolling" or "rotation" of the cow's body—the danger of this process when the stomach is distended with solid food and gas—and the great advantage, if not necessity, of having the parts flaccid and relaxed, and the contents of the rumen in as soft and fluid condition as possible.

The first case, which we may term Case V. (20th Feb., 1889)—a big, cross-bred Ayrshire cow, about eight years old—had shewn labour pains more or less for sixteen hours before I saw her, with the result that, despite the severe and long-continued straining, the mem-

branes were not broken, the twist effectually preventing their passage into the vagina; but the calf had been thrown on its back towards the left or near side of the cow, with the withers presented to the udder and doubled knees to the spine; while the head and neck, lying at full stretch, had been forced under the vagina, displacing the bladder to such an extent that the lower surface of the chin could be felt under the hand a few inches within the vulva lying immediately underneath the meatus urinarius,—the lower jaw being next the vagina and the frontal bones and face of the calf resting on the pubes close to the symphysis. When the cow lay down, the finger on entering the meatus was directed up over the head of the calf, and the urine could be made to trickle down. Such an unnatural position suggested even at first rupture, or at least extreme stretching of the walls of the uterus.

The cow had been fed on bog-hay, turnips, and mash,—the abdomen was big and some tympany present. Clearly to my mind the treatment here was laxative medicine, time, and then careful "rolling," as in our previous case.

At a little moorland farm however, in wet, wintry weather, the prospect of leaving, and of having to trot back again six or seven miles during night or early morning to "roll" the cow,—was not inviting. Convenience whispered that this was not such a bad case—that the uterus might perhaps turn as well with a full stomach as an empty one. The temptation to give the cow a roll or two was too great to be resisted, and the result was that we almost obliterated the vaginal twist, but the walls of the uterus were unable to bear the strain, and all efforts to extricate the head of the calf from its peculiar position under the vagina were fruitless. At the third or fourth half-turn the membranes rolled out of their own accord and burst,—the parts became more relaxed and natural—the passage to the calf was almost straight, but the head and neck seemed forced into and tightly embraced by a glove-like pocket formed by the uterine walls, from which we found it beyond our power to get it free. We could detect no rupture, but after one of the rollings over we noticed a little fresh blood on our hand, and shortly afterward the passage of some more—old, clotted and venous. The cow too had become more distressed, breathing much more hurriedly, and we gave the case up as hopeless.

To give the cow, however, one more chance for life, and as an experiment, a good firm dose of laxative medicine and stimulants was given, and next morning (eighteen hours afterwards) we found the tympanitis gone, the belly half the size, a very large quantity of hard fæces passed,—parts soft and relaxed, cow not much worse-looking, and in ten minutes without any difficulty we had the head up and the legs right, and everything ready for calving. All "too

late, however, the advantage came :" from the time that the head had been quietly lifted out of the glove-like pocket referred to, the liquor amnii poured out of the vulva, and, as *post-mortem* examination showed, it had also poured into the abdominal cavity through a rent in the neck of the uterus ; and the cow rapidly sank. The calf was found lying now in a natural position,—head on knees, with a rupture of a good few inches on the upper part of the organ, through which the crown of the calf, covered with the membranes, protruded.—Not a pleasant conclusion to ponder over.

Case VI.—A big young Shorthorn cow, newly purchased, was found at pasture on a Thursday evening (25th July, 1889) down with Milk Fever, and to get her under cover the owner and his men adopted the singular expedient of rolling her over and over for about twenty yards to the shelter of a lean-to shed or outhouse. She was there under the fever treated by the parties themselves, till on Saturday morning about two o'clock she began to calve, "burst the water-bag," and made but little further progress. I saw her about 4 a.m. She was recovering from the Puerperal Fever, but unable to rise, examination showing—almost at the full stretch of one's arm in the big cow—a regular vaginal twist, through which to the knee one foreleg protruded. Not a nice outlook, with the cow unable to rise.

We were fortunate otherwise, however ; the cow had had physic, which was operating nicely—a fine summer morning, and a nice level court to "roll" in. Tying up the cow's fore-legs to her elbows by a soft rope across the withers, and bringing the off-hind foot forward as if for castration, leaving the near leg free, four or five good men were ranged from head to tail, with orders to send her over well, and with no nonsense. Fixing my hand well into the twist, over went the cow from her near side across her belly to the off, and then right over her back to the near—a great improvement. Over again across her belly to the off-side—the membranes and liquor amnii escape—one forefoot and the head and lower jaw in an inverted position are easily felt and are corded. Grasping the lower jaw firmly, we told the men to give the cow another good round roll across her back (as we had plenty of room in the court) and the result was all we could wish, the head came into its right position, the other foreleg was easily got up, and allowing about an hour and a half for the os uteri to sufficiently dilate, the cow was easily delivered of a calf dead and beginning to decompose.

Remarks.—We have brought forward Case V. simply by way of warning—our bad cases as well as good. We shall never again if we can help it—owing to wind and rain outside—roll a big cow with *full* abdomen in a corner of a barn, with a mixture of

elderly men and lads not able to handle her. A distended stomach, the presence of a large quantity of solid food, and badly-managed rolling may tend to explain away some of the other cases of failure we hear of.

Case VI. tends to throw some light on the cause of Torsion. The rolling of the cow over and over twenty yards from right to left by the owner may have produced the twist, as our rolling her over and over from left to right for about eight or ten yards reduced it. Any sudden doubling or falling down may be the beginning of what ultimately becomes Torsion.

I may be permitted to state that I have read with pleasure and interest the remarks of Mr. Macgillivray and others on this subject. I can easily see how under certain circumstances and conditions Mr. Macgillivray's plan of "jamming" may be most useful, especially in cases where the twist is not too severe and confirmed, or the parts have become relaxed by laxatives or other causes. In Case III. of my own some such means were being tried. The lower jaw and feet were corded, and were being held tightly when the cow suddenly dropping and springing up again, the uterus righted itself. Mr. Thomson, of Aspatria, too, mentions three similar cases. Mr. Macgillivray's plan seems more elaborate and carefully considered, and when, as he states, "rolling" cannot conveniently be put in practice, "jamming" may with advantage be adopted.

To get the head and fore extremities fixed in the twist, and then by a degree of force and manipulation to bring the uterus and fœtus into proper position, appears at first sight to be the most natural and likely mode of procedure. A little reflection will, however, I think, show that it has its disadvantages, and has been too often tried.

In the first place, "jamming" or fixing means considerable work to the operator and pain to the patient. Mr. Macgillivray, if I remember aright, succeeded in one case after "one hour and a half's exertion." Mr. Thomson succeeded in another case after a good deal of labour and anxiety, three or four fellows pulling so well that when the calf came away with a rush, that genial practitioner was nearly extinguished on his own showing. Compare this, without the slightest presumption or any approach to it on my part, with Cases IV. and VI., about the worst cases of Torsion we have met with. No force whatever was used in these cases; in our opinion it would have been needless to attempt it with them. The fore feet and one of the hind were simply tied to facilitate the "rolling" process, and the cows previously well prepared by physic were rolled and over, with the result—our hand being fixed in the twist—that the cow herself in each case undid the folds, and delivery in an hour or two was natural and easy.

No tugging or working on our part, only a little planning and manœuvring, resulting in some amusement, but a thoroughly satisfactory finish.

Again supposing as in Case II. some one like myself ruptures the membranes and tries for two or three hours to bring the head and fore feet together into the twist, and finds that he can bring only the head by itself, or the feet by themselves, but not both together, and therefore cannot properly fix or jam the calf, and like myself fails. It is scarcely time then to turn to the rolling system. The membranes are broken; much of the waters has escaped; the parts are beginning to get irritated and dry; perhaps the calf has become emphysematous; the chances of success by rolling are reduced to a minimum. With a big emphysematous calf closely embraced, and held by a tightly-clasping dry uterus, it is almost folly to expect a favourable result.

On the other hand, supposing rolling is first tried. It takes but a short time to test it. The membranes it may be are untouched; the liquor amnii abundant; and should the rolling fail (which it has not as yet with me) then "jamming" or Denoc or Dareau's proceeding—suspending the cow from a beam—or any other measures may be tried, unprejudiced or interfered with by the previous rolling.

I would, therefore, strongly advise that in these cases of Torsion, rolling be first tried, in all but the very simplest cases. It is so easy and satisfactory for the operator when the cow is properly prepared, and good active men at hand to turn well. A little chloroform, too, I think would enhance the ease and value of the system. With the cow under its influence, "rolling" and the reduction of the twist should be still more easy.

Some may say that in cases no proper place and assistance can be had. This we experienced to our cost in Case V., but a little thought and waiting can almost always overcome this objection. Better give a dose of physic and wait till cover of night and roll the cow on the street, or hire a man or two to help, than perhaps kill the patient by ineffectual efforts at delivery without reduction of the twist.

Others may say there is no time to wait, and no great need for physic. Such has not been my experience. I have always found a moderate purgative, if not previously given, and an allowance of ten or twelve hours or more for its action of the greatest possible service.

"Rolling" or "rotation of the cow's body," practised in the way we have endeavoured to explain, appears to us the least painful, the most easy, and the most effectual means of reducing the vaginal twist and abnormal position of the uterus.

Puerperal Fever.—In the various articles and discussions on this disease I am surprised that so little notice is generally taken of its frequent and tantalising concomitant and result, viz., hard painful swelling of the parts in the region of the thigh and hock, resulting in inability to rise, the animal being practically and generally hopelessly "hamstrung."

Of the cases of Fever or Apoplexy I have met with, I think I am within the mark in saying that more than one fourth have been thus affected. The animal goes down in a comatose or semi-comatose state for eighteen or twenty-four hours, and begins to recover—looks about her—begins to feed a little—it may be to ruminate, and we expect her soon to get to her feet, but she doesn't; only rolls from side to side; and looking for a cause, we find the gastrocnemii tendons, near the point of the hock, swollen and painful, hot and tender to the touch. The muscles, too, in front, a little below the stifle, are enlarged and sore, while the fleshy part of the thigh behind has become converted into a big hard swollen mass. Generally both legs are affected; occasionally one only. The animal, as we all know, goes from bad to worse, loses all power over the hind quarters, till with brisket, belly, and udder pressed firmly to the ground she lies with a big, swollen hind leg on each side of her—a helpless object—retaining, however, almost full power over the fore extremities.

Post-mortem examination of a recent case of this kind shows considerable *dark-coloured* effusion underneath the skin and between the several layers of the tissues—often patchy in character. Some of the muscles on being cut into are found congested dark red, nearly black in colour, while others side by side are but little affected —the tendo-Achilles being almost always involved. In older cases, this appearance gives place to a dirty yellowish white or brownish yellow hard consolidation of the tissues which may go on to softening or sloughing. On cutting too into the fleshy mass surrounding the femur up to near the hip joint, we find the muscles for the most part healthy-looking but soft, while here and there are small lighter-coloured patches, dry looking, with the appearance of atrophy about them, contrasting strangely with the red healthy-looking tissue surrounding them.

What is this state of matters? I. Is it simply paralysis of the hind quarters—due to effusion or softening or derangement in connection with the spinal cord, or with the large nerves supplying the loins or haunch? Are these appearances simply the result and effect of insufficient or deranged nerve force? We believe that the paralytic theory will not of itself explain all the phenomenon exhibited. Simple paralysis does not, so far as we are aware, show itself by hard painful swelling of the muscles and tissues going on

to hard consolidation. The animal's legs are not at first paralysed, but the gastrocnemii tendons and part of the large flexors are so swollen and painful that the animal is to all intents and purposes hamstrung. And even in the more advanced stages, the legs never dangle loose and free like an animal broken or injured in the back or loins, but stick out almost at full stretch, hard, and stiff and enlarged about the stifles to twice or thrice their natural size.

II. Puerperal Apoplexy has been said to arise from some anatomical arrangement of the blood-vessels supplying the neck, head, and brain. Is there a corresponding distribution to the hind quarters ? III. Does this swelling arise from Embolism ? or, IV. Is it a form of Septicæmia ? or, V. Does it follow Puerperal Fever, as Rheumatism of the tissues surrounding certain joints supervenes occasionally on recovery from severe chest affection ?

Medical men appear interested in this disease, and as showing how one at least viewed the matter, I may mention an incident which occurred a good many years ago. A gentleman's cow, an Alderney, partially recovered from Milk Fever, but remained useless from this affection of the hind legs. Everything was done for her in the way of slings, stimulants, nerve tonics, etc., and at last she was dispatched under chloroform and bled very freely. During our *post-mortem* a medical gentleman of good standing in the neighbouring city (Edinburgh) came on the scene—examined the carcase carefully—heard all I had to say (with that neutral, passive, calmly meditative air which many veterinary surgeons might well copy), but said nothing until I took my leave, when, hastily calling the attendants, he ordered them instantly to wash their hands in very warm water, with soap, carbolic, etc. "They did not know the danger they were incurring," "Blood-poisoning, and Blood-poisoning of a very bad kind that cow had died of in his opinion." We thought when told that if such was the case we had often run the risk with impunity, but on a little reflection we were inclined to think that on the whole the M.D. was not far wrong. The cause and effect shows itself first locally in the tissues involved, not so far as we have been able to judge primarily in paralysis of the parts, and we incline to believe that it is a form of Septic invasion, or Blood-poisoning, as the medical gentleman termed it, the sequence of the fever after parturition.

We are yet, I fear, far from a perfect knowledge of the real nature, cause, *modus operandi*, and after effects of the so-called Puerperal Apoplexy or Milk-fever. In some instances we have undoubtedly apoplexy and death. In others, the apparent apoplexy passes off so quickly, and recovery is so rapid and lasting, that we doubt its presence.

A cow at parturition time seems to me not unlike a machine

charged with electricity or smokeless gunpowder. With sufficient exercise, and bowels and uterus and kidneys in good order—a copious flow and a good drawing-off of the milk—all goes well. But let some chill, or a want of exercise, or a little extra feeding or altered diet, or a dozen paltry changes—which at other times would do no harm—occur at calving time, and down goes the cow with what may be the big boom of Apoplexy or the small shot of Metritis, Enteritis or Peritonitis, Mammitis, or it may be Septicæmia. With these bad legs so often and too often to spoil our best cases of recovery.

As regards treatment of these cases, I have nothing new to add. I have only occasionally seen a case recover, after the swelling of the legs became thoroughly established. By far the greater majority with me never rise, but either die or are slaughtered. In premises in which a run of Milk-fever cases has occurred, I generally advise the parties to watch and give each calving-cow a good laxative if possible just before the labour pains come on—judging from our torsion cases, I believe this is good practice. It makes the calving more easy, and regulates the bowels at the same time. I further see at once to a thorough cleaning and disinfection of the whole cow-house by boiling water and freshly slaked lime. It may be fancy, but for a time at least I think this treatment prevents or puts a check on the further occurrence of cases of the disease.

TREATMENT OF BURSATTI BY SLOUGHING.

BY S. M. SMITH, M.R.C.V.S., A.V.D., KIRKEE, INDIA.

A NUMBER of articles have from time to time appeared in the veterinary journals on the pathology, etc., of Bursatti, and the treatment generally recommended has been excision and caustics. I would like to draw the attention, chiefly of your military readers, to a method of treatment I have lately adopted with very great success. But let it be clearly understood that I do not for a moment profess that this line of treatment will be at all successful if the lungs contain the "kunkur," as in some few cases I have seen in *post-mortems*.

The treatment is as follows: The Bursatti sore or ulcer is to be *completely* covered with finely powdered white arsenic, pressing it in lightly with the finger. The sore is then found to become perfectly dry. In three days' time a distinct line of demarcation appears, from which there will be a slight discharge of pus; and so the slough gradually becomes separated from the seat of disease, leaving behind it a healthy granulating wound having a nice bright red colour. Now this wound merely requires a simple dressing

three times a day, of ordinary white lotion (acetate of lead and sulphate of zinc), applied by means of tow. In all cases where it is possible, cover with bandages and tow saturated with the lotion (as on the legs); in other cases cover with cloths, or by glueing fine gauze above, to hang over the seat of disease. There are some cases in which the kunkur is deep-seated in muscular structure, as, for example, inside the thigh, and having an external opening by means of a small sinus. Lay the sinus open from end to end, but do not attempt to dissect out the kunkur. In three or four days a growth will have appeared by rapid granulation. Now, instead of attempting to take this down by excision, caustics, or actual cautery, simply cover it over with the powdered arsenic. In from four days to a week a slough will come away, bringing with it the deep-seated kunkur, and leaving behind a perfectly smooth healthy surface; the kunkur will be found on the inner face of the slough. As the depression which has been formed by the removal of the slough fills up, which it will do rapidly, the white lotion dressing and an occasional application of copper will be found sufficient. The end is that new skin is rapidly grown from the edges, and finally the wound disappears, the hair growing from the surrounding skin completely covering the part. This is a great advantage over destruction of a large portion of skin that takes place when excision is practised. I have operated on several cases at the angle of the mouth by excision, but I found the time was much less when the arsenic is applied, and it is certain the sloughing process is a much surer means of taking out the very small pieces of kunkur than the knife. And let me here say that merely picking out the small kunkur points from the connective tissue with the point of a knife, is absolutely useless; the sore may heal temporarily, but it will be sure to appear again. If the knife is used at all the incision must be made through healthy tissue, sacrificing a small portion of it, and thus preventing the recurrence of the disease. But I feel satisfied that the sloughing process is by far the quicker and safer method. And, in conclusion, I may state that to the question asked me by several officers (among them being H.R.H. the Duke of Connaught), who have inspected the cases I have treated, as to the danger by absorption or by the animal licking off the arsenic, especially at the corners of the mouth, I have replied that there is absolutely no danger.

I know there may be some cases in which the animal is absolutely covered with sores, but probably then the disease exists in the lungs, and the animal will never recover; but if it is decided to treat it, commence on one part of the body, and dress a few sores every second day. The amount of arsenic required is extremely small, and no untoward occurrence is to be feared.

PROPHYLAXY OF BOVINE CONTAGIOUS PLEURO-PNEUMONIA.

BY PROFESSOR A. DEGIVE, BRUSSELS VETERINARY SCHOOL.

(*Continued from page* 239.)

There is one fact of the highest importance, and which has been brought into salient relief by observations made in recent times, and that is the relative frequency of contagious Pleuro-pneumonia in a chronic or latent form, which most frequently passes unperceived, and which may remain stationary, and therefore be ignored, for a year, or even longer. In admitting that in this form the disease may be little if at all virulent, might it not happen that, from some accidental cause, it would become acute and very contagious? I am of opinion that in this way are produced a good number of cases in certain byres into which new cattle have not been introduced for several months, or even for more than a year.

Three principal preventive measures are applicable to suspected animals—*slaughter*, *immobilisation*, and *isolation*.

By *immobilisation* I mean removal from commerce, or prohibition from selling for any purpose but slaughter.

Of the three measures, the first two may be declared sufficient to prevent all danger of contamination by animals affected with the chronic disease.

The third, *isolation*, insufficient by itself, should never be employed except as an adjunct or complementary element to the other two.

It cannot be contested that the *slaughter* of the *contaminated* is the most certain means of extinguishing contagious Pleuro-pneumonia. Everywhere it has been applied in a rigorous and general manner (as in Baden, Switzerland, Alsace-Lorraine, Holland), the disease soon diminishes and ultimately disappears. But to obtain such a result it will be seen how necessary it is to increase the indemnity; though if it is considered what a small tax the expenses are subsequently reduced to, it should be recognised that the sum thus expended, however considerable it may be, is capital usefully invested, and which soon realises considerable interest.

The slaughter of contaminated animals is carried out in various ways. It may be imposed directly by formal prescription, obligatory, as in Switzerland; it may be done in an indirect, non-obligatory manner, as in the Grand Duchy of Baden, in making the proprietor desire it.

Though in principle the first system is certainly the most simple

and efficacious, I think the second is less vexatious, and consequently more practical.

In Baden the contaminated cattle are kept *severely isolated* for six months after the last case of disease. Before the expiry of that period the owner has always the right to demand the slaughter of the whole of his stock, and he is awarded an indemnity equivalent to the total value, previously estimated, of each animal, a deduction being made of the sum realised by the sale of the flesh and offal.

When slaughter is officially prescribed, it is naturally fair to allow some delay in order to allow the animals to be fattened somewhat.

It seems to me that the desired result may be perfectly attained by a system quite as simple, but more economical than those adopted in Switzerland and the Grand Duchy of Baden. This system may be epitomised as follows :—

1. General slaughter shall not be adopted in the case of contaminated animals undergoing fattening in industrial establishments (as breweries); they shall be considered as *hors commerce*, immobilised, and only to be sold for direct conveyance to the abattoir. After severe sequestration of two months at least, they may be allowed to circulate freely, and be exposed in ordinary markets, but they should be returned to their owners when not sold.

2. Everywhere else than in these establishments, contaminated cattle should be severely isolated *for six months at least*, as in the Grand Duchy of Baden. During these six months the owner may always claim general slaughter, and receive an indemnity equal to one-fourth of the value of each animal, the maximum not exceeding £6. I am persuaded that this compensation should be sufficient to induce the owner to demand general slaughter.

In order to facilitate this operation, authority should be given to have it effected at several times.

3. Every contaminated beast used or sold during the two first months of isolation should be slaughtered on the spot, or sent direct to the abattoir, where it should be kept isolated until it is killed, all necessary precautions being observed to prevent spread of the contagion.

I believe it is unnecessary to enter here upon the conditions pertaining to isolation in its three principal forms—*sequestration*, *cantonment*, *sanitary zone*; and the measures which are complementary to them—*census*, *marking*, and *surveillance*, as they are generally known.

(*c*) *Measures applicable to Places, Vehicles, etc.*

I also abstain from entering into details concerning the measures

relative to infected things, and shall simply express my views with regard to the subject as follows :—

1. Cowsheds, fairs, markets, and vehicles which have been occupied by diseased or suspected animals should be carefully cleansed and disinfected. A cowshed especially should not be again occupied until it has been thoroughly disinfected.

2. Pastures which have been frequented by diseased cattle should be interdicted for at least fifteen days.

3. The various things which have been ordinarily employed with diseased or suspected animals, or at their slaughter, transport, or burial, ought to be destroyed or disinfected. Straw and fodder may be used for solipeds.

III. General Measures.

With regard to the general measures, common to all the contagious maladies, I shall limit myself to speaking of compensation, penalties, legislation, and regulations.

1. *Compensation.*

The compensation to be given to owners of animals affected with a contagious disease responds to three principal indications. It constitutes (1) a legitimate remuneration for the injury caused by the application of the different measures applied in the general interest; (2) a particular award for losses undergone; (3) a stimulus or encouragement to the faithful execution of certain formalities (declaration), and the employment of certain non-obligatory but useful measures, such as the general slaughter of the contaminated.

In order to accomplish this triple object, it is essential that the compensation should be liberal; the more liberal it is the more efficacious it will be.

2. *Penalties.*

If there is need to encourage owners to carry out certain measures, it is necessary, *per contra*, to inflict *very severe* pains and penalties on those who neglect the execution of the various sanitary prescriptions decreed by the authorities.

3. *Legislation, Regulations.*

To produce their useful effects, the sanitary measures should be consecrated by special laws, decrees, and regulations. Sanitary legislation comprises two essential elements—(1) the ordinances and measures which ought to be carried out; (2) the manner in which they should be applied by the combined and co-ordinated action of the authorities, veterinary surgeons, and others. In this respect the function of the veterinary surgeons is certainly

the most important; and so there can be no possible efficacious prophylaxy without a proper veterinary sanitary service.

In my opinion, the following is the general type upon which such a service should perform its functions: Under the direction and control of a chief veterinary inspector and a certain number of veterinary inspectors of a secondary order (county, district, etc.), sufficiently well paid to be altogether independent of clients—under this double direction and control should act the largest number possible of veterinary surgeons who will consent to conform to the obligations of official service.

Conclusions.

As it is not possible for the Congress to discuss in detail all the questions submitted to it, I believe it will be useful to note, in the form of conclusions, the essential points on which it ought to particularly fix its attention and give its judgment.

* * * * * *

1. In the interests of sanitary police, it is very important that the inspection of animals slaughtered for consumption should be generalised and rendered obligatory.

2. Animals suspected of being affected with contagious Pleuropneumonia should be slaughtered, like those really attacked by it.

3. With regard to contaminated cattle (suspected of contamination) undergoing fattening in industrial establishments, general slaughter may be usefully replaced by *immobilisation*. Such animals should be declared *hors commerce*, and should only be sold for direct transmission to the abattoir.

4. Contaminated animals ought to be isolated for six months.

CANCER IN THE LOWER ANIMALS.

BY R. W. BURKE, M.R.C.V.S., ARMY VETERINARY DEPARTMENT, KILKENNY.

In an excellent review of the history of Cancer in herbivora, which appeared in a recent number of the *Journal of Comparative Pathology and Therapeutics*, the editor stated that the only way of telling Cancer from other diseases was by defining the character of the neoplasm by microscopical investigation. When it is known how imperfect is the knowledge of malignant new growths, and whilst the pathology of such growths is still quite unknown, it is a gain at least to discover that there are yet more certain and as useful tests of the accuracy of our statements, namely, the property peculiar to malignant growths, which is special to them, and which needs attention if the place of Cancer is to be defined. There are the clinical characters of the disease, the conditions of soil and local climate most favourable to its

development, etc., and which the editor does not recognise, because he has no experience of the latter in either patient. Dr. Moore, in a recent lecture on Cancer, delivered before the Royal College of Physicians of London, said, "The microscopic characters alone are not always sufficient. It is essential, in the investigation of this subject, always to consider together these three circumstances—microscopic structure, naked-eye appearance, and clinical history."

We note what Dr. Haviland, lecturer on the "Geographical Distribution of Disease" at St. Thomas's Hospital, London, teaches: "Among the 630 registration districts into which England and Wales are divided, those low-lying districts which were often traversed by, or were contiguous to, fully formed rivers that seasonably flooded the country through which they flow were characterised by the highest mortality from this cause of death. On the other hand, those districts which had the lowest mortality had a high average level, were situated on or near the water partings where rivers derived their sources, and where the rock-base under their soils consisted of the older geological formations, such as the Cambrian, Silurian, old red sandstone, and mountain limestone, or of the more recent chalk, and where floods were either impossible or only temporary" (*Lancet*, 14th Sept., 1889). This is in perfect harmony with what I have found prevails throughout India in the case of Cancer among the lower animals, as I stated both in my "Tropical Diseases of the Horse" last year, and in other papers published before. With the above remarks of Dr. Haviland, then, I fully coincide, and can only add that an excellent illustration of his observation with regard to the geographical distribution of Cancer may be had in the case of our animals, when I stated that it was for this reason that the Government stud at Hájipur was broken up some years ago, since the number of rejections annually for Barsáti proved a pecuniary loss, and it was resolved to choose stations elsewhere for breeding. I have, moreover, shown that there are stations now in the country in which Barsáti is unknown or but very scarce, and that subjects of the disease show improvement in their condition on arrival in these stations, viz., at Sangor, Jubbulpore, Simla, Mussoorie, Naini-Tal, and other hilly districts; while stations that are flooded practically during the rains and those along the principal river-beds show the largest number of admissions for Barsáti every year. Most unquestionably there is some connection between the rains and Barsáti as witnessed in India; but what that connection is remains to be shown, as may be witnessed in the case of human Cancer.

It is some few years since I pointed out the microscopical

characters of Barsáti in the lower animals, and illustrations of which appeared in this journal at the time of my observations. I have only to repeat what I then showed, that Cancer in the lower animals shows variously shaped cells enclosed in a fibrous stroma, having no intercellular substance. Indeed, the cellular elements, which appear in clusters, are often entirely replaced by simple fibroid tissue, a feature remarkable to the species, and which has led to so much confusion regarding the anatomical characters of neoplasms in general. This peculiarity, we would add, does not characterise Cancer alone, but is common to tissue metamorphosis in the lower animals, and is one reason why tissue-metastasis is, happily, so slow in development in all malignant disease of animals—*e.g.*, Melanotic Sarcoma (Melanosis) in the horse, Tuberculosis in the horse, sheep, pig, etc., and many other diseases. Can we, therefore, say that because Melanosis does not run a rapid course in the horse, it is not Sarcoma; and because Tuberculosis is not so rapid generally in our animals as it is in man, that it is not the same disease? By exercising a very little judgment we shall, I think, learn that there are many little differences which will permit of explanation when they are applied to practice. For a long period our insular prejudices prevented many from profiting by the teachings of every-day experience, and so there are those who tell us that Sarcoma and tubercle are not known in the horse, because, as we have before stated, both these diseases run a much milder course, as a rule, in this animal.

When Metastasis is witnessed in Barsati (as shown by Messrs. Oliphant, Meyrick, and ourselves) there is less doubt shown regarding the malignancy of the disease; but immediately the question of "virulency" is brought in. Why is the disease not more virulent? and why, as shown by numerous *post-mortem* examinations, should Barsáti be so often found transferred in the liver, lungs, and spleen principally, and other organs secondarily? This, we venture to say, is the experience regarding human Cancer, which may be consulted in any work upon Cancer. At the *post-mortem* examination of hundreds of cases of Cancer in man, similar lesions in the liver, lungs, spleen, and other organs have been noted. It is no new observation, but dates from the time of Hunter, and perhaps before then. I believe, however, that, so far as knowledge goes, there are some who, if they admit the presence of secondary disease due to metastasis, expect to find, as in the human patient, abscesses and vomicæ which seldom appear in our animals and but rarely in man. The comparative "latency" in malignant new growths peculiar to some species is striking, and it would be still more interesting if we included tubercle and some other diseases in this series.

Editorial.

THE VETERINARY PROFESSION AND TUBERCULOSIS.

Tuberculosis at the present time is engrossing a large share of the attention of laymen and medical practitioners, because of the injury it is inflicting upon the species of domesticated animals in which it most frequently appears, and the risks to which its prevalence exposes mankind. But it would appear, if we are to judge by what is published in medical journals, that everything known with regard to the scourge is comparatively new, and that the veterinary profession has only lately begun to study it and to indicate its dangers. Never was a statement more unfounded, and the proofs that such is the case are to hand on every side; so that the charge of ignorance or apathy which has been preferred against the profession with regard to the alarming malady, by certain periodicals, cannot be substantiated. If there is any animal disease which, so far as the public health is concerned, veterinary surgeons can claim to have thoroughly investigated, long before the sister profession cared to consider it, it is Tuberculosis; though appeals were directly specially and earnestly to physicians and sanitarians to take it under their cognizance, and so aid ourselves in promoting measures for checking its prevalence, and in this way protecting human life, yet it is only recently that they have listened to these appeals, and they do not appear to be ready, even now, to acknowledge what had been done before they entered the field.

It may be as well, therefore, to glance briefly at what has been accomplished by veterinarians with regard to the sanitary aspect of Tuberculosis, and in a public manner, so that the result of their efforts should extend beyond our own profession. Reference need not be made to what our Continental brethren have done in this direction—the valuable work carried out by Chauveau, Gerlach, Harms, Bollinger, Günther, Leisering, Zurn, Toussaint, Bagge, Semmer, Saint-Cyr, and others for many years—as this has been fully recognised by their medical *confreres;* so our remarks will be confined to what has been attempted in this country in obtaining and diffusing knowledge with regard to Tuberculosis as a disease to be deal with by sanitarians. Previous to 1870 it seems to have attracted very little attention, even as a disease of bovines, and though its contagiousness among them had often been more than suspected, yet that its transmission to other species could take place was apparently not imagined. Before that year Villemin had experimentally demonstrated its transmissibility by inoculation, while Gerlach and Chauveau had shown that ingestion of tubercular matter could likewise produce it.

In a paper read by Professor Walley before the West of Scotland Veterinary Society in 1872 (*Veterinarian*, 1872, p. 634), there is a casual reference to the danger of the flesh of diseased animals: "Here I would say that there are few animals, the subject of tubercle, which

ought to be used for human food, no matter what the monetary loss may be upon such animals." This mention would not get beyond the profession, in all probability. But in 1874 there appeared a lengthy paper in an influential medical quarterly journal (*British and Foreign Medico-Chirurgical Review*, October, 1874), from the pen of Dr. Fleming, in which the subject is dealt with in such an exhaustive manner that subsequent investigation has added but little to what was then pointed out. The identity of the disease in animals and man was shown, its infectiousness in cattle, and the probability of its being so in man was noticed and exemplified, while its dangers were strongly insisted upon, as the following quotations will show: "The bovine species suffers more from the disease than any other, and it is this fact which invests the question of transmission with such extreme importance. . . . The flesh of cattle is consumed as food, and it is essential that it should be in as healthy a state as possible; though the process of cooking might be relied upon, to some extent at least, to annul any pernicious properties it might have acquired through the animal having been in a diseased condition during life. Far otherwise is it with milk derived from the cow. This seldom undergoes any process which would be likely to destroy whatever injurious qualities it might chance to be endowed with through the unhealthy condition of the animal which yields it; and when we reflect that milk enters largely into the diet of young people, is, indeed, the chief aliment of children and infants, whose bodies it builds up, the question of acquiring disease in this way, and especially such a malady as Tuberculosis, becomes one of the gravest moment." "The commencement of Phthisis is generally so insidious in the human species that it is most difficult to arrive with any degree of certainty at the causes which directly induce or favour its development, but, from the evidence before us, it is to be feared that at least one of its sources must be referred to the utilisation of the carcases, but more especially of the milk, of phthisical cattle as food. It is certain that Tuberculosis is a common and a very destructive disease, among dairy cattle especially, and more particularly among those in towns; that the udder of these animals is one of the glands not infrequently involved; that infants and adults consume milk in somewhat large quantity, indeed it is the principle article of diet of young children; and that Phthisis is a very prevalent and fatal malady in the human species, and chiefly among the dwellers in towns and cities.

"From what has been already ascertained, there is every reason to view with grave suspicion the use of the flesh of phthistical cattle as food, especially if the disease is much advanced and the tissues generally involved. But with more reason, the milk from cows affected with Tuberculosis should be prohibited, more particularly for the use of infants, who mainly rely upon milk for their sustenance, and whose powers of absorption are very active. Even if such milk did not possess such dangerous infective properties, its deficiency in nitrogenous elements, fat and sugar, and the increased proportion of earthy salts, would alone render it objectionable as an article of diet. It has long

been known that it was liable to produce diarrhœa and debility in infants; but though many children fed on such milk have died from general or localised Tuberculosis, the part played by this fluid in its production has not been suspected."

These statements were published in one of the most influential medical periodicals of the day, fifteen years ago; and in "Veterinary Sanitary Science and Police" (vol. ii., p. 368), published in 1875, the dangers attending the use of the flesh and milk of tuberculous animals is again strongly insisted upon.

In the following year the same authority delivered a public lecture before the Society of Arts, on the "Contagious Diseases of Animals; their Influence on the Wealth and Health of the Nation, and How they may be Combated" (*Journal of the Society of Arts*, Feb. 25th, 1876, p. 262), when the opportunity was again presented of pointing out the perils which this disease imposed upon mankind and animals. At the meeting of the British Medical Association at Cambridge, in 1881, he also read a paper on the malady, specially dwelling on the dangers to which it exposed the community; and in the previous year (1880) he had published a pamphlet with the title, "Tuberculosis from a Sanitary and Pathological Point of View," in which these dangers were fully detailed; while in 1883 he translated and published the very important report which had been prepared for the International Veterinary Congress held at Brussels in that year, on "The Influence of Heredity and Contagion on the Propagation of Tuberculosis, and the Prevention of Injurious Effects from the Consumption of the Milk and Flesh of Tuberculous Animals."

It should also be mentioned that Professor Walley, in his "Four Bovine Scourges" (published in 1879), treats of Tuberculosis and the risks of its transmissibility to the human species.

Surely, then, after this array of evidence, we cannot be blamed, as a profession, for not having given timely warning of the dangers which such a disease brings into our midst. The fact is that we sounded the warning note long before it would be listened to, and we have never ceased to sound it; now that it has been heard it is scarcely fair to rebuke us because a deaf ear was turned to it. We are not aware that anything has been left undone by the profession in pressing the urgency of Tuberculosis as a question seriously concerning the public health.

TRANSMISSION OF TUBERCULOSIS TO A CHILD BY THE MILK OF A TUBERCULOUS COW.

THE *Revue d'Hygiène* states that Professor Demme, of Berne, reports the case of a child four months old, without any hereditary predisposition to Tuberculosis, dying from Tuberculosis of the mesenteric glands. These glands contained the characteristic bacilli, but they could not be found anywhere else. The child had been fed on the milk of a cow kept specially for this purpose. The animal was killed, and an examination made of its carcase, when the left lung and pleura were found to be markedly tuberculous. A bacteriological examination of the milk revealed, after several unsuccessful searches, Koch's bacillus in the fluid expressed from the deeper parts of the mammæ.

ON THE TREATMENT OF LARYNGITIS CHRONICA SUPERFICIALIS BY MEANS OF INTRALARYNGEAL INJECTIONS.

BY T. ŒSTERMANN.*

VETERINARY surgeons in country and suburban practice, and also Army veterinarians, frequently have their attention drawn to a form of dry irritable cough from which horses in their charge are found to suffer.

This chronic cough, which does not in any way endanger the life of the patient, is nevertheless so obstinate that it is greatly feared, owing to the danger of Pulmonary Emphysema supervening. Many good horses become, from this cause, only fit for slow work. It is, therefore, a matter for congratulation that Dr. Dieckerhoff has discovered that the malady can be cured by means of intra-laryngeal injections. Dieckerhoff has pointed out that the old plan of treating cough by blisters and the usual medicines does not act in a satisfactory manner, and further, that this desirable end can only be obtained by the direct application of remedies to the larynx by means of injections. I am aware that many practitioners have not availed themselves of Dieckerhoff's discovery, because they feared that fatal results might follow; so in order that they may be reassured on this point, I purpose to record a few of the innumerable cases which I have treated by this method.

I. In 1888 I treated a ten year old stallion. It had suffered from cough for six months, and had been treated by a colleague in nearly every imaginable way, without benefit. With his permission, I attempted Dieckerhoff's method, as published in *Adam's Wochenschrift*, 1886 (p. 15). With a laryngeal syringe I injected 30 grammes of $\frac{1}{2}$ per cent. solution of alum. The dose was repeated in three days. On the fifth day I noticed a rather hard, painful swelling in the region of the puncture, which, however, when gently rubbed with ung. cinerium, disappeared sufficiently to allow of a fresh injection being carried out on the eighth day.

The result was so satisfactory that in fourteen days the animal was cured and sent to work.

II. A twelve-year old mare had been a roarer for three years, but the affection was not bad enough to stop her work; she was admitted on the 22nd May, 1889. During the previous six months a cough had been added to the other trouble.

She did not cough much in the stable, but very badly when at work, even to the extent of partial suffocation. On the 23rd May I injected into the trachea 30 grammes of a solution of subnitrate of bismuth (5 : 100). On the 26th the dose was repeated; on the 31st May 50 grammes were injected; on the 4th June 50 grammes more were injected.

June 8th. The animal was exercised for half an hour; she perspired freely, but did not cough. After the exercise another injection was made.

June 12th to 20th. The patient has been trotted and galloped for half an hour daily, and has not coughed. On the 20th she was returned to her owner.

III. A four and a half year old gelding has had a cough for some months, and the usual treatment has had no effect. There is a slight nasal discharge and the throat is very tender. Patient coughs frequently in the stable.

Treatment much the same as in Case II. The horse was admitted on the 23rd May, and discharged completely cured on the 5th June. I saw the animal again on the 27th June, and it was still well.

The author records several other cases which had suffered for several months from chronic cough. He treated these cases as already described,

* Translated from *Adam's Wochenschrift*, No. 36, for September, 1889.

and returned them cured to their owners in a short time. One case he sent back in eleven days.

In concluding, he states that cures will only occur when there is no bronchial or pulmonary complication—such as Emphysema, for instance.

Reviews.

VETERINARY MEDICINES: THEIR ACTIONS AND USES. By FINLAY DUN. Seventh Edition. (Edinburgh: David Douglas. 1889.)

When a medical book reaches a seventh edition, there is the strongest possible evidence of its utility and popularity. The first edition of Mr. Dun's "Veterinary Medicines" was published thirty-five years ago; the sixth edition in 1882. Each edition shows the progress which has been made in pharmacology and therapeutics, and the additions to the list of agents forming our *materia medica*. The edition just issued marks, perhaps, a greater advance than any of its predecessors, and appears to represent the present position of our knowledge of drugs and their actions and uses. Many improvements have been effected in the arrangement of matter and in the manner in which the book has been got up; and good authorities have been consulted and borrowed from in order to render it complete in its information, though the number is comparatively small, especially if we take into account the number of foreign writers whose books have largely contributed to this subject, such as Ellenberger, Schütz, and Siedamgrotzky's work, "*Lehrbuch de Allgemeinen Therapie der Haussaügethiere*," that of Röll, "*Lehrbuch der Arzneimittellehre für Thierarzte*," that of Fröhner, "*Lehrbuch der Thierärztlichen Arzneimittellehre*," that of Dieckerhoff, "*Lehrbuch der Speciellen Pathologie und Therapie für Thierarzte*," and others.

The work has our hearty recommendation, and will prove as acceptable to veterinary surgeons and students as heretofore. In the next edition it is to be hoped the publishers will indulge purchasers with cut leaves; in these days of limited leisure, few have patience to sit down with a paper-knife to separate the leaves of a book of more than 700 pages.

A TEXT BOOK OF PHYSIOLOGY. By J. G. MCKENDRICK, M.D., LL.D., F.R.S. Vol. II. (Glasgow: J. Maclehose and Son. 1889.)

Not long ago we were able to direct the attention of the veterinary profession to the first volume of Professor McKendrick's "Physiology" as a treatise or text-book of the highest order, and we felt ourselves justified in recommending it to the students no less than to the earnest practitioners of veterinary medicine, as a most excellent guide in the study of vital phenomena. The author says in his preface: "It has been my endeavour throughout this volume to lay before the reader the main facts of physiological science, and, as far as possible, to state these facts in terms of measurement. The time has gone past for vague generalities in the description of physiological phenomena, and phy-

siology is, year by year by year, drawing nearer to her true position as a science, dealing as strictly with the phenomena and basis of organic life as physics deals with those of dead matter. At the same time, it is impossible altogether to resist the promptings of speculative inquiry, and I have accordingly yielded to these in several instances—in particular, in treating of the phenomena that lie behind a carthiac contraction, and in discussing the intimate nature of nervous action."

Professor McKendrick places the facts of physiology before the reader in such a manner as to combine lucidity and precision with all the deep interest and attractiveness that attaches to the phenomena of life; and with originality of matter and views—for much of his own valuable researches and opinions are given here—he makes available the most recent investigations of others, in order to render the knowledge of structure and function as complete as possible. We know of no better book on physiology than this, and feel assured that our opinion of it will be endorsed by everyone who has watched the progress of this science, which the author has done so much to advance and adorn. The woodcuts are excellent, and the paper and typography all that need be desired. We might make long quotations from the work in support of the opinion we have advanced with regard to it, but forbear presenting disjointed fragments, and so curtailing the pleasure and satisfaction which those of our readers who obtain it will derive from its perusal and study.

A Text-book of the Practice of Equine Medicine. By W. Robertson, F.R.C.V.S. Revised by J. Penberthy, F.R.C.V.S. Second Edition. (London: Baillière, Tindall, and Cox. 1889.)

The lamented death of the late Professor Robertson threw the task of completing a second edition of his text-book on his colleague Professor Penberthy; for we understand that previous to his decease he was already engaged in preparing the present issue.

We spoke in favourable terms of the first edition, published in 1883, and the opinion we then gave we can now repeat. Professor Penberthy appears to have done his best to make the work as acceptable as a useful reference book to veterinary surgeons, as the previous has proved itself to be. Professor Robertson's professional skill was undoubtedly of a high order, but his literary style was peculiar, so that his sentences were often involved and somewhat perplexing. His reviser could not do much to amend this, unless he had pretty well re-written the book, which he has not ventured to do; but he has contrived to perform his share so carefully and adroitly that it is difficult to trace his individuality in his emendations and additions, by which he has rendered the work perfectly modern, *i.e.*, up to date. We have only been able to find one paragraph which the reviser may think fit to correct in the next edition; this is on page 439, where, in dealing with the treatment of Roaring, it is stated, "In the Veterinary University of Berlin, Professor Müller has removed the left arytenoid cartilage and the left vocal cord in a large number of cases, which have been very much benefited. The removal

is effected by means of a longitudinal incision through the body of the thyroid cartilage," etc. Now, Professor Müller has never operated for this affection, we believe, but his colleague, Professor Möller, has; and neither the latter, nor yet any other veterinarian on the Continent, so far as can be ascertained, has ever removed the vocal cord and arytenoid cartilage at the same time, for the relief or cure of Roaring; while no one would be so imprudent, it is to be hoped, as to make a longitudinal incision through the *body of the thyroid cartilage*, as this would be a serious and, in all likelihood, an irreparable blunder.

Proceedings of Veterinary Medical Societies, &c.

ROYAL COLLEGE OF VETERINARY SURGEONS.

QUARTERLY MEETING OF COUNCIL, HELD OCTOBER 9TH, 1889.

Professor J. WORTLEY AXE, President, in the chair.

Present :—Professors Duguid, McCall, Pritchard, and Walley; General Sir F. Fitzwygram, Dr. Fleming, Sir Henry Simpson; Messrs. J. D. Barford, Thomas Briggs, T. Campbell, B. Cartledge, Thos. Greaves, Wm. Hunting, H. Kidd, J. McCall, Jas. F. Simpson, Jas. Storrar, P. Taylor, W. Whittle, W. Wilson, Wm. Woods, F. W. Wragg, — Thatcher (Solicitor), and the Secretary.

Absentees.

The SECRETARY stated that he had received letters from the following gentlemen regretting their inability to attend the meeting :—Messrs. Perrins, Lambert, Cox, and Simcocks.

Presentations to the Library.

The SECRETARY stated that the following presentations had been made to the Library :—By Professor Brown, copy of the "Annual Report of the Agricultural Department of the Privy Council;" by Mr. Finlay Dun, the Seventh Edition of "Veterinary Medicine;" by Regimental Surgeon J. A. Meredith, A.V.D., "Report on the Recent Outbreak of Anthrax amongst the Horses of the 6th Regiment of Dragoon Guards."

A vote of thanks was accorded to the donors.

Correspondence.

The SECRETARY said he had received two applications for the diploma of the Royal College—from Mr. Wm. Jack and Mr. J. F. Healey. He had also received a letter from a registered practitioner, who had lately graduated and obtained his diploma, asking that his name might be expunged from the list of existing practitioners. There was also a letter from a member of the profession, stating that he had lost his diploma, and asking that another certificate might be granted to him.

Mr. JAS. F. SIMPSON moved that a certificate be granted, providing evidence were given that the diploma had been lost.

Mr. PETER TAYLOR seconded the proposal, which was agreed to.

The SECRETARY read a letter from Mr. Dudgeon on behalf of the North of England Veterinary Medical Association, and also a letter from Mr. Villar on behalf of the Central Veterinary Medical Society.

The letters were referred to the General Purposes Committee.

The report of the Finance Committee was received and adopted.

Report of the Registration Committee.

The SECRETARY read the report, from which it appeared that the Committee recommended that steps be taken to remove the name of Mr. S. Gibbs from the Register, his conduct being disgraceful in a professional respect.

Professor WALLEY said that if there was no appeal against the conviction, and there was no attempt to show the conviction was wrong, he would move that Mr. Gibbs's name be removed from the Register.

Sir HENRY SIMPSON said that he had had something to do with bringing the matter to the attention of the Council, and he thought that the Council, before going to the length of striking the name off the Register, should tell Mr. Gibbs that the Council had deliberated upon his case, and if he wished to appeal he should attend on a particular day.

Professor WALLEY moved that the recommendation of the Committee be adopted, and that the usual course in such matters be taken.

Mr. J. F. SIMPSON seconded the motion, which was carried.

On the motion of Dr. FLEMING, seconded by Mr. PETER TAYLOR, the report of the Registration Committee was adopted.

Report of the General Purposes Sub-Committee.

The SECRETARY read the report, showing the improvements to the museum and the work still in progress.

On the motion of Sir HENRY SIMPSON, seconded by Mr. WRAGG, the report was adopted.

The SECRETARY read the Obituary List.

Mr. WILLIAM WILSON said that since the last meeting of the General Purposes Committee the College had received a portrait, and he hoped that due notice would be taken of its reception.

Mr. KIDD gave notice that at the next quarterly meeting of the Council he should move that a new charter be obtained for the purpose of amending some of the existing bye-laws, and making certain alterations.

Professor WALLEY asked if anything had been done with reference to the colonial and other colleges as to the business brought before the Council on a previous occasion.

The PRESIDENT said a considerable number of prospectuses had been received from various foreign and colonial schools, and that the attention of the Council would shortly be called to the matter.

The International Congress.

Dr. FLEMING asked to be permitted to state that he had attended the International Congress at Paris, and other members of the profession were also present. Their French colleagues had acknowledged them as English practitioners, and had elected him as the representative of English veterinary surgeons. He regretted that the Royal College was not officially represented at the Congress, as nearly every other college in Europe and America was represented.

Sir HENRY SIMPSON said that the whole profession was indebted to Dr. Fleming for having attended the Congress, and he trusted another opportunity would not be allowed to go by without the College being officially represented.

Professor WALLEY moved, "That this Council records its appreciation of the kindness accorded to our colleagues and friends during their visit in Paris at the International Congress."

Mr. WOODS seconded the motion, which was agreed to.

Motion by Mr. Hunting.

Mr. W. HUNTING moved, "That it be an instruction to the Secretary that

every candidate for the diploma be required to produce evidence of age at the time of paying his fee to the Secretaries of the Examining Board." Unless the Council wished the matter to be settled at once, he would propose that it be referred to the General Purposes Committee. He thought that before a student came up for his Final Examination he should produce proof of having arrived at the necessary age.

Sir HENRY SIMPSON asked whether Mr. Hunting's motion referred to the Oral Examination or to the Final Examination.

Mr. HUNTING said that he would alter his motion thus, "That all students presenting themselves for final examination should give proof of their being the proper age before they undergo that examination."

The motion was agreed to.

Written Examinations.

Mr. T. BRIGGS moved, "To bring forward for discussion the subject of instituting written examinations in addition to the present Oral and Practical Examinations. He suggested that the motion should be submitted to the General Purposes Committee, who, he thought, could better formulate a system by which it could be effectively carried out.

Mr. PETER TAYLOR seconded the motion, which was agreed to.

Wood Pavement.

General Sir FREDERICK FITZWYGRAM moved, "That the General Purposes Committee be instructed to obtain an estimate for laying down wood pavement in front of the College. He asked that that might be done, and that the Committee present its report at the next meeting.

Professor WALLEY suggested that the committee should be also asked to inquire whether the neighbouring proprietors would join in the undertaking, in which case the expenditure would be materially lessened.

Mr. PETER TAYLOR suggested that the cost of paving with asphalte should be ascertained.

Sir HENRY SIMPSON said that the public authorities were not necessarily bound to accept any proposals made by the College.

The PRESIDENT said it would be desirable to obtain some guarantee that the wood pavement would be maintained after being laid down.

Mr. WRAGG thought that the Council Chamber itself, where the noise of the traffic was most heard, should be first altered. Some opinion might be obtained whether or not the acoustic properties of the room could not be improved.

Mr. GREAVES said he thought the difficulty might be obviated by having double windows in the building.

It was agreed that the matter should be referred to the General Purposes Committee.

Professor WALLEY moved, "That the percentage of marks to be obtained by students in the educational examination be raised from 30 to 50 per cent." He thought the Council would agree that the time had come when something ought to be done to approximate the value of the examinations to those of the medical profession. He did not suggest that the change should come into operation at once, but that a reasonable time be allowed for candidates to prepare themselves. He would add as a rider to the motion that the raising of the percentage of marks should not come into operation for eighteen months or two years.

Mr. J. F. SIMPSON said he was very glad to see that the motion came from the principal of a school. He should like to know whether a result was kept of the number of rejections of unsuccessful men who had applied for admission to the various schools.

The PRESIDENT said that no record was kept except the certificates received from the principals of schools.

Mr. MCCALL said that in Glasgow the examiner granted the certificate, and it was then forwarded to him to sign. When the student came up for his examination the document was placed in the Secretary's hands, and he was then allowed to go up for examination. For the last two years 50 per cent. had been the standard. He should think that about one-third of the students were rejected at the First Examination.

Sir HENRY SIMPSON said that Professor Walley's proposal seemed to resolve itself into a new regulation.

The PRESIDENT said that it would be only a standard agreed upon by the Council.

Sir HENRY SIMPSON asked whether it would not be better to say that it be an "instruction" that the percentage of marks be fifty.

Mr. WILSON called attention to the fact that at page 61, section 2, of the Regulations, it was stated that "The nature and extent of this examination shall be fixed by the Council from time to time."

Mr. J. F. SIMPSON said he would be very glad to second the motion if Professor Walley made it eighteen months.

Professor WALLEY said he would do so with pleasure, and would say "That it applies to examinations in January, 1891."

Dr. FLEMING asked whether there was any record of the number of marks the students were obliged to obtain.

Professor WALLEY said that there was.

The PRESIDENT asked Professor Walley whether he meant the maximum to be 50 per cent. upon each subject, or 50 per cent. upon the total.

Professor WALLEY said that at the present time the examiner demanded 30 per cent. in all cases. He wished to make it clear that it should be 50 per cent. on each subject on and after the 1st January, 1891.

Mr. HUNTING said he did not think it would be possible for the Council to tinker up the examinations in the way they were attempting. They had absolutely delegated duties to two educational bodies, one for England and one for Scotland, and he did not see how the Council were to instruct them as to the number or quality of the questions set at the examinations. A copy of all questions in each examination had, he thought, to be laid before the Council, and until that was done they were simply working in the dark.

Professor WALLEY said that the matter would come up for consideration under Mr. Wilson's motion. The question for the Council to decide then was whether or not they should raise the percentage of marks, and that it should come into operation in January, 1891.

The motion was put and agreed to.

Proposed Scholarship.

Professor WALLEY moved, "That this Council take into consideration the advisability of instituting a scholarship for the purpose of encouraging successful students to continue their scientific studies." The time had arrived, he said, when the Council should do something towards elevating the profession by encouraging students and graduates to go on with their education after leaving the College. In all medical universities and schools there were bursaries of great value by which students were enabled to continue their studies for one, two, or three years, and he thought it was high time that some such course was adopted in their own Corporate body. He considered the College was now in such a position that it could afford such a burden as he suggested. He did not say how much money should be given, or how long it should continue. All he wished was that the Council should take into consideration the advisability of instituting a scholarship. The medical pro-

fession were constantly saying that veterinary graduates were not educated up to the standard they should be, and that they did not know pathology and biology. Veterinary surgeons were not drawn, as far as money was concerned, from the same class that medical students were, and there was now only Sir Frederick Fitzwygram's prize to encourage veterinary graduates to improve themselves and raise the standard of the profession. That prize had no conditions whatever attached to it, nothing being said about studying for six months or anything of the sort. If necessary he would willingly refer the subject of his motion to a committee for consideration and report.

Mr. WILSON, in seconding the motion, said the General Purposes Committee could fully consider the question, and he was sure would arrive at a conclusion which would be satisfactory to the profession. It was evident, when a young man showed extraordinary skill, he ought to be put in a position which would assist him in prosecuting his studies still further after having obtained his diploma. There were many young men who would make ornaments to the profession had they the means to do so. The ability was there, but up to the present time the means had been wanting.

Mr. J. F. SIMPSON said he heartily agreed with the spirit of Mr. Walley's motion, but thought the matter, being purely one of finance, ought to be referred to the Finance Committee.

Sir HENRY SIMPSON contended that it was a matter for the General Purposes Committee, but he thought there could be no objection to both committees being set to work. The Finance Committee would be able before the next quarterly meeting to report as to the actual state of the finances, and the Council would then know what money it had to deal with.

Professor WALLEY said that in order to bring the matter to a termination he would move that the question be referred to the General Purposes Committee for consideration and report.

Mr. WILSON seconded the proposal, which was then put and carried.

Tuberculosis a Contagious Disease.

Professor WALLEY moved, "That, in the opinion of this Council, Tuberculosis in animals should be dealt with as a contagious disease in so far, at least, as actually affected animals, or animals suspected of being affected with the disease are concerned." He said the question of the recognition of Tuberculosis as a contagious disease had been under the consideration of the Privy Council for a considerable period, but hitherto no actual steps had been taken for dealing with it as such. He thought nobody would disagree with him when he said that Tuberculosis was a most deadly disease, and undoubtedly could be transferred from animals to man, and therefore should be dealt with in some form so as to reduce the danger attendant upon its existence among animals. At present inspectors were absolutely helpless in removing animals from byres and in preventing the milk from cows suffering from the disease being added to the general yield of milk and scattered abroad throughout the kingdom for dietetic purposes. The time had certainly come when the proper authorities, be it the Board of Agriculture or any other body, should recognise the disease in some degree as contagious. He would not go so far as to class it with other contagious diseases, but he would certainly ask for power to be given to inspectors to seize diseased animals exposed for sale. He was sure that if pressure were put upon the proper authorities by such a body as the Royal College something might be done in the matter. He would also suggest that the terms of his resolution should be forwarded to the proper body which would have to deal with the matter.

Professor DUGUID said that in dealing with the kiseases of people the Local Government Board would have to be approached, but with regard to the communication of diseases from one animal to another the Board of Agri-

culture would have to be addressed, but it must be understood that the latter body had no concern whatever with public health matters. The Local Government Board was undoubtedly the right body to apply to.

Mr. WILSON seconded Professor Walley's motion. In doing so he said he thought it was the Board of Agriculture that must be approached. The question was of great importance, and it was highly desirable that the disease should be grappled with at once. He did not think it should be brought forward under the compulsory slaughter clauses, but under the Contagious Diseases (Animals) Act for the purposes of isolation, and preventing the sale of milk from diseased cows.

Professor DUGUID observed that the sale of diseased meat lay entirely with the sanitary authorities, under the direction of the Local Government Board, as did also the inspection of cowsheds and the sale of milk.

Mr. HUNTING thought if the gentlemen on the Council who were connected with the Agricultural Department used their influence there might be a chance of the matter being thoroughly brought forward. Power should be given to bury the carcases of diseased animals, because they were a dangerous commodity.

Dr. FLEMING said he questioned whether the Council had any power to act in the matter, having hitherto acted solely as an examining body. He did not see how they could approach any body unless they were willing to adopt the functions of a scientific body, which might be consulted and authorised to give an opinion on such questions.

Professor WALLEY reminded the Council that it had taken up similar duties before. If the College wished to keep its position among the community it was time it moved in a different course from that which had been followed in the past. All he asked the Council to do was to recognise the necessity which existed for the proper bodies to deal with Tuberculosis as a contagious disease.

Sir HENRY SIMPSON said that if it were desirable for the Council to take up scientific subjects this was one which they might proceed with. They had better opportunities of judging what was good or bad for the community as regards disease amongst animals than any other body, and they ought if possible to take the initiative in the matter, which undoubtedly before long must be settled in the manner desired by Professor Walley and others. If they would thrust the matter home they must enlist the sympathies of Members of Parliament, and have a deputation to the Local Government Board. Last year the Council had been honoured with a request from the Royal Commission on Horse Breeding, which was a great compliment, and he hoped they would recognise that their sphere was not to sit and legislate for themselves alone, but for the community at large. If the resolution were proceeded with, and a copy of it sent to the Local Government Board, it could do no harm, but might do an immense amount of good.

Mr. GREAVES said that if the College took the steps proposed the country ought to be grateful. The resolution met with his entire approval, and he should be delighted to see it carried.

Professor DUGUID said the first question any public department they might approach would ask was, Were they prepared to say that the disease was due to contagion, and that alone? In many cases the disease was hereditary, and if that was admitted they would be asked to show the percentage of cases due to contagion. The whole case would then fall to the ground. There was the further difficulty of seizing diseased or suspected animals, and the question of paying compensation, and the scale of it. The whole matter had been under consideration for years, but no solution of the problem had yet been arrived at.

Professor PRITCHARD moved that the motion be rejected, mainly on the

ground that the majority of cases of Tuberculosis were due to hereditary predisposition and not to contagion.

Professor DUGUID seconded the motion.

Professor PRITCHARD'S motion was then put and lost.

The original motion was then put and carried.

On the motion of Mr. HUNTING, seconded by Mr. KIDD, it was resolved, "That the Secretary be instructed to forward a copy of the resolution to the Board of Agriculture, the Local Government Board, and the Royal Agricultural Society."

Veterinary Education and Meat Inspection.

Professor WALLEY moved, "That a committee be appointed to take into consideration and report to the Council at its next meeting—(*a*) As to the best means of approaching the Government with a view to the obtainment of a grant in aid of veterinary education in this country. (*b*) As to the best means of directing the attention of Government to the urgent necessity which exists for legislative interference in the matter of meat inspection." He thought he should be supported by the Council when he said that it was high time that the Government of the country should do something for the veterinary profession. All other learned bodies had received Government assistance, but this body had received none; and the Government, he urged, ought to recognise the importance of their profession. As to the question of meat inspection, he considered the present condition of things a disgrace to any civilised country, for year after year men were employed in inspecting meat who knew positively nothing about it. The medical profession charged them with knowing comparatively nothing about meat inspection, and that they were not the proper body to consider it. In the name of all that was good, who but veterinary surgeons were the proper body to do so? Professor Walley then quoted from lectures delivered in American veterinary colleges, showing that meat inspectors were obtained from the ranks of graduates in veterinary medicine. It was quite time, he said, that this country should move in the matter.

Professor DUGUID said he thought the first part of the motion inconsistent, seeing that they were on the one hand trying to establish scholarships themselves, and on the other hand approaching the Government for aid. He said he thought the Government would be likely to help the College if it only made an effort to help itself. The Council had a strong case with which to go to the Government, and i they could only bring a little political power to bear he did not see how the Government could give a refusal.

Mr. WHITTLE seconded the motion, which was agreed to.

A Committee was then formed of the following gentlemen, to whom the matter was referred:—The President, Dr. Fleming, Mr. Hunting, Sir Henry Simpson, Professor Walley, Gen. Sir Frederick Fitzwygram, Professor Duguid, Professor McCall, Professor Pritchard, and Professor Williams, with power to add to their number.

Farriery.

The PRESIDENT said he wished to call the attention of the Council to a small but interesting matter. For many years past great complaints had continued to be made by persons interested in the welfare of horses about the backward condition of the farriers' art in this country. Recently small attempts had been made by the Royal and other Agricultural Societies to overcome the many abuses associated with horse-shoeing by offering prizes for competition among local shoeing smiths. More recently, he believed, a few members of the profession residing in London had made a move in the same direction. Feeling that the time had come when something of a permanent character should be done to improve the art of farriery, he had

thought that if these scattered attempts could be united and properly organised, great and lasting good would accrue to the cause. In any movement of this kind he thought the Royal College should occupy a forward position, and it was on this account that he desired the co-operation of the Council in a scheme which he was now seeking to develop. He felt the time had come when some educational and certificating body should be established in the interest of farriery. With this object in view he had already brought the matter to the notice of the Veterinary Committee of the Royal Agricultural Society, and he had reason to believe that the question would receive their careful consideration. He ought also to say that the Farriers' Company had expressed an earnest desire of doing something in the same direction. It had occurred to him that if these three bodies could be brought together in concerted action, the desirability of taking steps to improve the art of farriery might be fully considered, and some scheme decided upon for giving effect to their decision. At present he simply desired to ask that the Council would nominate two or three of its members to form, with others from the Royal Agricultural Society, and he hoped also the Farriers' Company, a joint committee to take action in the matter.

Professor PRITCHARD asked whether communication had been made with the Farriers' Company on the subject.

The PRESIDENT said both that Company and the Royal Agricultural Society had been conferred with, and he hoped to secure the co-operation of both. He felt encouraged to proceed, inasmuch as he had received unsolicited promises of help from gentlemen who wished to see a good result of the movement.

Sir HENRY SIMPSON said the President and one or two other members of the Council were members of the Royal Agricultural Society, and they would be able to approach that Society and the Farriers' Company also if necessary.

The PRESIDENT stated that they could do so.

Sir HENRY SIMPSON moved that the gentlemen on the Council who were also members of the Veterinary Committee of the Royal Agricultural Society, with the addition of Professor Pritchard, be appointed to confer on the subject.

Mr. J. F. SIMPSON said he thought they ought to watch the interests of their own profession first, and see, before they proceeded at any length, the result of the prosecution of a man who put over his door "Veterinary Forge." They ought to be careful, and not put greater power into the hands of the farriers.

The PRESIDENT said the institution would be called "The Institute of Horse-shoeing," and he thought the term "farrier" would soon become obsolete.

Professor DUGUID suggested that the Yorkshire and Lincolnshire Agricultural Societies, who first took up the question years ago, should be consulted with a view of getting a member or two on the Committee. The Bath and West of England Agricultural Society ought, he thought, to be also consulted.

The PRESIDENT concurred. He agreed they should have as much influence as possible.

The following Committee was then appointed:—The President, Dr. Fleming, Professor Pritchard, Sir Henry Simpson, Professor Brown, and Mr. Hunting.

SPECIAL MEETING.

On behalf of General Sir Frederick Fitzwygram, who had left the Council Chamber, Mr. J. F. SIMPSON moved, "That in the Final Examination for diploma, the term 'Theoretical' be substituted for 'Oral.'"

Dr. FLEMING objected to the use of the word "Theoretical," inasmuch as the subjects were practical. In justice to the subjects and to the examination let the term "Oral" remain.

Not being seconded, the President did not put the motion.

Alteration of Sections.

Mr. WILLIAM WILSON moved: "That Section 2, p. 61, be amended thus: By striking out the first sentence of the clause and substituting in lieu thereof, 'Students who do not produce one or other of the certificates referred to shall be examined by a Board of Examiners appointed by, and under the direction and supervision of, this College, to whom they shall report the result of the examination, which shall be uniform and applicable to the whole of Great Britain.'"

Professor WALLEY seconded the motion.

Dr. FLEMING suggested that "United Kingdom" should be substituted for "Great Britain."

The motion, as amended, was then put and carried.

Mr. WILSON further moved, "That sub-section 2 of section 1 of the Regulations for the Examination of Veterinary Students in General Education shall be altered by inserting the word 'or' between the word 'first' and 'second' on the first line thereof, and by striking out the word 'third' on the second line thereof."

The PRESIDENT thought an injustice might be done if that alteration was agreed to.

Professor WALLEY supported the President.

Mr. HUNTING seconded the motion.

Mr. J. F. SIMPSON supported the resolution, which was put and carried.

Sir HENRY SIMPSON suggested that the committee meetings should be held on the day preceding the quarterly meeting, as so much business had now to be transacted. He thought also that the Council meetings might be held at an earlier hour. The work was increasing almost every day, and some attempt ought to be made to keep pace with it.

Professor WALLEY moved, and Sir HENRY SIMPSON seconded, a vote of thanks to the President, and the proceedings terminated.

ROYAL VETERINARY COLLEGE.

PROFESSOR YEO, F.R.S., King's College, delivered the inaugural address at the Royal Veterinary College, Camden Town, on October 1st.

Col. Sir Nigel Kingscote, K.C.B., presided, and the theatre was filled to overflowing with students and visitors.

The CHAIRMAN, in opening the proceedings, said: Gentlemen, my pleasing duty is first of all to call upon Professor Yeo to deliver his introductory address. No words of mine are needed to say who he is, for, as you know, he is one of the greatest physiologists of the day; one who has given great attention to cattle diseases, and also, as some of you know, is an Examiner at the Royal College of Veterinary Surgeons. Without saying more, I will ask him to give his introductory address.

Dr. GERALD YEO, who on rising was greeted with loud applause, said:

Mr. CHAIRMAN AND GENTLEMEN,—I have to thank the Principal for the honour he has done me by inviting me to open the session at the Royal Veterinary College. I undertake the duty with all the more pleasure, since I have not been asked to give a formal inaugural address, and my remarks need not therefore assume the form of advice or a lecture as to the future industry of the beginners, or their moral guidance.

I am proud to have the honour of welcoming the students, new and old, to

an institution which has made such enormously rapid strides towards perfection within the memory of many here present, and one which now renders the very important public service of producing an adequate supply of well-educated, scientific veterinary surgeons.

Having had the advantage of being a little behind the scenes as examiner, I can speak very confidently as to the kind of moulding the students receive during their short curriculum at this College, and I am glad to say that I know it to be excellent and practical in every respect. Perhaps there is not quite so much required from the veterinary student as from his unfortunate fellow student of medicine in the sister profession; but it is, I think, none the less creditable that I have found that the general average of the students taught here, show a more accurate and useful acquaintance with the subjects of examination than do the candidates of any other qualifying body for which I have had the honour of examining.

When we compare the remarkably short time required by this school to attain its present admirable state of efficiency, with the centuries required to elaborate our modern medical schools, we must admit that education in veterinary science is rapidly overtaking that in human medicine, and in many respects may be said to be quite on a par with, if not in advance of, the elder sister.

I am glad to reflect that the time is now past when a hard and fast line of demarcation was supposed to exist between the study of veterinary and human medicine, and every day we find rapidly disappearing that mutual ignorance of each other's methods of study, which engendered distrust between the two professions. It is quite certain that in the general study of Pathology the two professions must be united. As there is but one Physiology for man and the lower animals, so there is but one Pathology. Now-a-days veterinary surgeons more fully recognise the great value of the careful study of morbid appearances, of the innumerable *post-mortem* records made by human pathologists in past years, of the microscopical work done in our more scientific pathological laboratories, and the absolute necessity of trying to find out the cause and course of disease before attempting its cure or prevention. On the other hand, human pathologists are now quite convinced that the most careful study and record of human pathological changes cannot give them all the knowledge they require about the causes of disease. They see that, as well as observing her abnormality, they must question Nature by experiment, and this can only be done in the domain of the veterinary pathologist, where induced disease of the lower animals may be experimentally studied. The experimental pathological laboratory now-a-days bears the same relationship to morbid anatomy as the physiological laboratory does to the dissecting room, and is therefore absolutely essential for the advance of pathological science. Moreover, the pathology of the lower animals has the advantage of offering a much less complicated field of study than the pathology of man. It does not comprise the many diseases brought on by the various occupations and habits of civilisation, by the vices of mankind, or by that human scourge, Syphilis.

The great progress in pathological knowledge made in the recent part of this century must be attributed to the fact that experimental researches into the cause of disease in the lower animals had been added to the ordinary observations in human pathology. Were it not that the curricula are already overloaded, I would like to see the student in each profession attending a course of pathology in some school belonging to the other. I am glad to say there already exists at least one laboratory where pathology may be studied with equal benefit by human and veterinary medical students, and in which admirable work both in human and comparative pathology has already been done. It is hardly necessary to say that I allude to the Bacteriological

Laboratory in King's College, where owing to the facilities given him by the Principal and authorities of the Royal Veterinary College, Professor Cruikshank is able to devote special attention to the pathology of the domestic animals.

It must be admitted that the prevention of disease is the highest aim and the common goal of all medical art, and it is curious to find that comparatively little importance is given to preventive measures in human medicine. The greater part of our therapeutic science is devoted to the relief of suffering caused by ailments which physicians seem hardly to hope ever to succeed in eradicating. But in veterinary science, in the majority of cases, prevention of disease takes the foremost place. In the lower animals disease in most cases means depreciation of value or worthlessness, and if the patient cannot be perfectly cured it may as well be destroyed, so that palliative treatment is not of much value.

Among the preventive measures which nowadays receive most attention, Inoculation must be given pre-eminence, and the progress achieved in this department affords a good example of the rapid advance made with the new methods of research in pathology.

In olden times these matters moved slowly. A few years after the year 1721, when inoculation with the virus of Smallpox was introduced into England, it was well known amongst the peasantry that anyone who had Cowpox was protected against the more formidable disease. Yet inoculation with the virus of Smallpox remained in vogue for over a hundred years after that time. It was not until the year 1774 that Mr. Jesty, a sturdy farmer, dared to brave the prejudices of his neighbours—who asserted that his patients would acquire the characters of the infected beasts, and vaccinated himself and family. It was about eighty years after that date, a period including all Jenner's energetic work, that vaccination was made compulsory. The history of vaccination also shows that it is extremely difficult to arrive at exact conclusions in the case of human patients, and even now there are many who doubt its advisability as at present carried out, and the question may be said to be still *sub judice*.

On the other hand, the rapid paces with which such questions advance, by active experimentation in the case of the lower animals, may be recognised from the following facts. Little more than two years after M. Pasteur commenced the study of the silkworm plague, he had formulated a system by means of which he mitigated the virulence of the disease. In some twenty years after Davaine had first mentioned the bacillus of Anthrax, Koch had worked out in detail the life-history of the organism, and a couple of years later the virus could, by special modes of culture, be robbed of its virulence in such a way as to enable protective inoculation to be adopted. In the same way, within the space of a few years, the organism causing so-called Chicken-cholera was detected, cultivated, attenuated, and the disease checked by preventive inoculation.

Did time permit, I might name many more cases where experiment promises to lead to prophylactic measures; and at this moment we are receiving more and more reassuring accounts as to the prospects of finding a preventive for that uniquely fatal disease, Rabies.

There certainly seems to be a great future in store for preventive inoculation. There is no obvious reason why all kinds of communicable disease may not be prevented by this means. But we must guard against being carried too rapidly forward by the flood of this mode of treatment. In several instances its efficacy is still doubtful, in more than one it has so far proved powerless, and it may even be a means of propagating disease if indiscreetly employed. Among the diseases in regard to which the question seems in some minds not to be definitely settled is the peculiar contagious

Pleuro-pneumouia of cattle, a disease which has cost Great Britain a million in the last twenty years, a disease which is painfully interesting to the agriculturist from its contagious and fatal nature, and most interesting to the pathologist for many special peculiarities.

How is this disease influenced by inoculation?

In considering such questions as this, care must be taken not to put aside too lightly long-established vulgar belief simply on the score that it is not founded on a scientific basis, or by scientific observers. We must remember that vaccination, which certainly was useful when Small-pox was more rife, originated from common hearsay and vulgar belief, and now is only supported by a few general principles which remain in the category of pure empiricism. In the case of the lower animals, where experimental research is feasible, the value of preventive inoculation should be scientifically tested. In Pleuro-pneumonia either it is useful or harmful. In the one case it should be encouraged; in the other prohibited. From a scientific point of view its efficacy cannot be admitted to be an established fact; and in almost every item in the evidence of an unscientific kind we find opinions diametrically opposed to one another. The characteristics of any given disease that would *prima facie* suggest that it might be checked by preventive inoculation may be thus enumerated:—

A. The disease should be communicable.

B. One attack should give immunity from (*a*) subsequent contagion; (*b*) subsequent inoculation.

C. Inoculation should give immunity from (*a*) subsequent inoculation; (*b*) subsequent contagion.

D. Exceptional cases, taking the disease a second time, or after inoculation, should run a modified course.

As far as time allows, I shall consider the position of Pleuro-pneumonia in respect to each of these points. We find at the outset that it is not communicable in the widest sense of the word. One of the great peculiarities of this disease is that it cannot be given to an animal by any indirect means that have yet been tried, while at the same time it is extremely contagious, *i.e.*, easily transmitted from animal to animal. In this respect it seems to stand alone among the diseases of the lower animals. The pathologist finds it quite impossible to transmit the disease artificially by mediate communication, and the practitioner finds it impossible to control its rapid spread through a herd when introduced by a single diseased animal. There seems no positive evidence that the disease can be communicated even by the medium of stalls lately inhabited by diseased animals. One might surmise that the virus would seem to thrive only in the warm moist breath of the animals themselves, as if, indeed, the organism—if the virus really owes its activity to one—was, during the active pathogenic stage of its existence, intensely susceptible to changes of temperature. Though the pulmonary disease cannot be set up artificially, there is no doubt that the fluid from the diseased lung, if introduced into the connective tissue, causes a specific local change in the lymphatic system in many respects like that of the lung. The fact that the lung disease is not, in the widest sense, communicable is a strong, but not a conclusive argument against inoculation. To me the experiments on this question simply suggest that the disease is local in origin, and that the virus travels slowly by the lymph channels without apparently affecting the general system through the medium of the blood.

With regard to the statement that one attack gives immunity from a recurrence of the disease, there seems to be no positive evidence of any great weight in support of such a supposition. The modern method of treatment, namely, slaughter the moment the disease is suspected, materially narrows the field of observation, for except the first attack remain latent throughout

its course the possibility of recurrence is removed. Under these circumstances a small amount of positive evidence showing recurrence of the disease must be admitted to have greater weight than much negative evidence to the contrary. The reports of the Agricultural Department give many instances of the disease showing itself in a case which was thought to have been cured. M. Leblanc mentions an animal which had twice been inoculated, and at *post-mortem* examination presented an old encysted focus of disease in the right lung, and, in a distant part, a perfectly fresh and independent mass of consolidation. An experienced observer described to the recent Committee two similar cases, in one of which a recurrence occurred after eight months' interval of apparently perfect health, and in the other the animal reinfected herself after having been fifteen months under observation, and in perfect health, and died on the seventh day from the development of the second attack. On this point I can speak confidently from personal experience, as I have repeatedly met with old encapsuled masses of "cured" disease whose duration must be measured by years, together with perfectly independent recent exudation and pleural complications which brought the second attack under the notice of the veterinary surgeon.

From these facts I feel bound to conclude that while there is no adequate evidence that one attack confers immunity from a second, there is proof positive that the same animal can have a fresh pulmonary lesion after a considerable interval of perfect health, and may even affect her own lungs from an old cured focus of disease.

Next comes the question, Can inoculation "take well" in animals which have had the disease? And does it run the same course as in the clean animal? The reports of the Agricultural Department teem with evidence of inoculation of affected animals. The Belgian Commission reported that natural Pleuro-pneumonia and the lesions following inoculation may exist together in the same animal, and that having had the disease did not seem in the least to change the phenomena following inoculation. The great Scotch advocate for inoculation, in his evidence before the Departmental Committee, admits that those animals which have the pulmonary disease in a very limited area do accept inoculation. Another witness gives cases in which the inoculation ran an acute and typical course, yet the animal was found to have marked pulmonary lesions of old standing. Professor MacFadyean describes three cases in which after careful *post-mortem* examination the two lesions in an unmistakeable form were found coincident in the same animal. During my own relatively small experience I met with two cases inoculated by a most skilled operator, in which I found the two lesions co-existent. The tails of the animals which had been inoculated some weeks before were considered typical examples of the inoculation tumefaction, while the *post-mortem* examination showed that the pulmonary affection must have existed for a period long prior to the date of inoculation.

From these facts I am forced to conclude that having had the disease, or even having it acutely at the time, does not in the least prevent or modify the characteristic phenomena that follow inoculation.

The possibility of re-inoculation ought to be the simplest of the questions I have proposed to consider, yet I find it difficult to get exact and positive evidence on the subject. The Belgian Commission thought that the phenomena of inoculation may be produced several times in the same animal, and one frequently hears of second inoculations. But the advocates for the operation deny this re-inoculation, and say that the fact of a second inoculation "taking well" proves the first to have been unsuccessful. The Departmental Committee of last year do not seem to have considered this point worthy of searching investigation. However, I think it of the greatest possible importance in forming an opinion upon the prophylactic value of inoculation.

If inoculation prevent similar phenomena taking place again in any part of the animal it must be allowed that the general system has in some way been affected. On the other hand, if the inoculation do not protect the subject from re-inoculation it cannot be said to give immunity from the ordinary contagion of lung disease. I can find no evidence that convinces me that inoculated animals have complete immunity from re-inoculation. Probably the part inoculated may be unable a second time to undergo the characteristic lesion which follows the first operation. But is it true that after inoculation the exudation from freshly diseased lungs can be injected into any part of the areolar tissue or into the veins without producing any effect? Of course, a negative result of secondary inoculation may have been frequently obtained without proving positively that re-inoculation is impossible.

I know it to have been stated that it has been over and over again demonstrated, after successful caudal inoculation, that injections of the virus could be made with perfect impunity into the loose areolar tissue of any part. But I should like to ask those who are satisfied with these demonstrations whether they themselves would take the responsibility of the loss in case fresh virus were injected into the loose tissues of a herd of cattle a couple of months after successful caudal inoculation? Knowing the facts concerning the simultaneous co-existence of pulmonary and caudal disease, I personally should be slow in incurring any such risk.

In the absence of more conclusive evidence I cannot accept it as proved that an animal can only take inoculation once, and I think this a point well worthy of careful scientific investigation.

Now, with regard to the fourth point, which really is the main question. Does inoculation protect against the pulmonary disease? The evidence is of a very diverse and contradictory character. A very strong general feeling in favour of inoculation exists in the minds of the persons most interested in the subject. In Australia this is especially remarkable, as may be seen from the evidence given before the committee by the colonial witnesses.

The security supposed to be given by inoculation is shown to be doubtful by the number of cases that succumb to lung disease after that operation.

In the Reports of the Agricultural Department I find that cases of inoculated animals having taken the disease are frequently recorded. Indeed, when we remember that only those selected as the most healthy and resistent are chosen for inoculation, it seems to introduce no difference in the statistics.

In France some 39 per cent. of inoculated cases took the pulmonary disease. In Germany about 23 per cent., just the same percentage as in the Aylesbury dairy in 1873. In about thirty years of the practice of the most experienced inoculator in this country some 8 per cent. of inoculated beasts, carefully selected as sound, subsequently took the lung disease, although every possible precaution, such as immediate slaughter of the suspected cases, etc., was taken to keep down the sources of contagion. The question then arises, Would there be a much greater percentage of cases were these precautions alone depended upon, and the inoculation quite omitted? I think not.

In Belgium—the birthplace of inoculation—a commission in the year 1853 decided against its preventive efficacy. However, it may be urged that at that date the operation had not been perfected. At the fourth International Congress at Brussels, in 1883, it was decided that it should only be allowed with sanction of the Local Authority, and performed under the surveillance of the police. In 1885 Dr. Salmon reported to the American Government that inoculation did not lessen the losses and was unable to stamp out the disease, and he suggested that it should be prohibited by law.

The recent Departmental Committee, after hearing all the evidence on the subject, report against the efficacy of preventive inoculation, but they say,

"We cannot deny that inoculation in itself is valuable as a palliative and preventive method of treatment."

I presume the popular feeling in its favour must have led some of the committee to this conclusion, for I have failed to find in the evidence given before them anything that seems to afford adequate support for such a statement.

We must conclude from these facts that inoculation is far from acting as a perfect prophylactic to Pleuro-pneumonia. It might, however, have beneficial influence without conferring absolute immunity upon the inoculated beasts, by reducing the severity of the disease so as to render it less fatal. But this point is not the one most strongly urged by the advocates of inoculation, nor is there any striking evidence in support of such a theory. And even were its truth admitted, it would only help to prove the theoretical value of the operation, because practically, owing to the fact that the lightly affected animal must ever remain a focus of contamination, this kind of mitigation of the severity of the symptoms would be quite valueless, and inoculation would prove worse than useless in attempting to get rid of the disease.

From these general considerations I cannot, then, satisfy myself that caudal inoculation with the exudation taken from the diseased lung is advisable, either as a preventive or palliative mode of treatment.

But is there no scientific evidence which can remove these general doubts? In these days of microbic cultivation can we not find the *materia peccans?* Can we not learn how to curb its virulence?

To demonstrate scientifically the value of prophylactic inoculations the following evidence should, I think, be forthcoming:

(1) The disease must be proved to depend upon one specific organism, for some such reasons as these:

a. Invariable presence of the organism in the tissues.

b. Possibility of absolute isolation of organism, and repeated pure cultivation.

c. Renewed production of the disease by cultivated organism.

(2) The virulence of the virus must be shown to be capable of mitigation by means of:

α. Prolonged pure cultivations.

β. Change of soil (different animals).

γ. Excess of temperature.

δ. Variation in O. supply.

ϵ. Action of antiseptics.

If we seek this evidence in Pleuro-pneumonia we find certainly that there is no lack of bacteria in the diseased parts of the lung. This one would expect from the fact that the part has free access to the open air. Some of these bacteria are found to be present with remarkable constancy, but their perfect isolation and pure cultivation seem to offer considerable difficulty. I understand M. Pasteur devoted some time to the separation of the specific microbe, but he abandoned the research. Since then, however, many observers have isolated and cultivated organisms which they consider to be the specific cause of the disease, and a remarkable similarity exists between some of the forms of bacteria described by different experimenters.

An important link in the chain of evidence seems to be wanting when the production of the pulmonary disease is attempted. I am not aware that any experimenter has yet satisfied anyone but himself that he could produce the pulmonary lesion from a cultivation. Indeed, cultivation seems rapidly to rob the supposed virus of its virulence, and by the time a really pure cultivation of any of the suspected organisms is obtained it seems to have lost its power of setting up even the peculiar local changes in the connective tissue which accompany successful inoculation.

M. Arloing, of Lyons, recently communicated verbally to me the substance of his paper at the Veterinary Congress in Paris, detailing his method of isolating the bacterium and his mode of mitigating the virulence of the virus by intravenous injections of the cultivations, which set up changes in the lymphatic glands of the animal. From these glands he could obtain the same organism; and inoculation with material from these glands produced a much less violent lesion. Thus, no doubt, the bad effects of inoculation may be lessened or removed, but as far as I could gather from our conversation the probability of the prevention of Pleuro-pneumonia remained as far distant as ever.

I shall not touch upon the good reasons set forth in the report of the Departmental Committee for the refusal to admit the advisability of experimental research with a view of testing the relative efficacy of inoculation and of slaughter as modes of stamping out the disease. But I think the question of inoculative prophylaxis urgently demands careful scientific investigation, in order to determine whether the operation be not more than useless.

If it cannot be applied so as to be perfectly prophylactic by conferring complete immunity upon the inoculated beasts, it must be worse than useless, for any palliative effect could only tend to prevent the recognition of a disease already too obscure, and thus to perpetuate instead of eradicating the plague.

In my opinion except it be definitely proved that inoculation of one part gives immunity from further inoculation of any other part of the animal, the operation should be condemned and prohibited except under the sanction and control of skilled inspectors, and under all possible restrictions, and removal prohibited.

If the local phenomena caused by inoculation cannot be warded off or rendered impossible by a previous operation, I cannot conceive any logical grounds upon which its prophylactic efficacy can be based. The poor beasts should be spared the pain and inconvenience of losing the useful tip of their tails and the owners saved the needless expenditure and anxiety of such futile procedures.

The CHAIRMAN: Gentlemen, it is now my pleasing duty, as Chairman, to propose a vote of thanks to Dr. Yeo for his most interesting lecture. I am sure one and all will heartily agree with me in supporting that vote of thanks. To me his lecture has been most interesting. It would be unbecoming and ridiculous of me to put forward any expressions of my own, as an unscientific person, with regard to Pleuro-pneumonia and inoculation, but one may have one's private opinions, and I have held the belief for many years past that inoculation was ineffective. I do wish it could be for once and all established whether inoculation is of any use or not. I am sure as long as some people have got it in their minds that inoculation is effective we shall never get rid of disease, which I am afraid is rather spreading than otherwise in this country. As a breeder of cattle, and knowing the feeling of breeders of cattle over a good part of the United Kingdom, I do know it is engaging the attention of all of them very seriously at this moment; and I would ask you scientific gentlemen to put your shoulder to the wheel, and at all events let us unscientific people know what is the best thing to be done. My belief is as regards cattle, slaughter or extreme isolation. I have not come here, however, to give my opinions or to discuss Professor Yeo's lecture, with which I cordially agree. I was very glad to hear the few introductory words before Dr. Yeo came to his subject; that is, as regards the status of you gentlemen and the veterinary profession universally. I did feel great delight in thinking that during the few years I have been one of the Governors of this Institution the status of the gentle-

men studying here, and the status of the veterinary profession altogether, is far better understood by the community at large in this kingdom. I am afraid I can look back to the time when the veterinary profession was not thought very much of, at all events in this country. Now, I can assure you, such is very far from being the case, and agriculturists do look on veterinary professors not only to rear and cure their cattle, but in many other ways as regards their cattle, horses, sheep, and pigs. People now do wish to study the subject, and be taught by others how to prevent disease attacking their flocks and herds. I cannot help thinking, and you will all go with me in this, that the veterinary profession has made great strides during the last few years, and you gentlemen who have come here to study, having passed out of the College, become members of the profession *pari passu* with those who have to doctor human beings. I feel that this is now far better understood by the community at large, and I congratulate you and this College upon it. I will only make these few remarks, and I now propose a vote of thanks to Dr. Yeo for coming here to-day and giving us such an interesting lecture.

Professor YEO.—Thank you very much for your kind reception.

Professor AXE.—I have to make an announcement for which I have no doubt some are looking forward with a good deal of anxiety. I have to inform students, who have recently passed the examinations, of the result of those examinations and the prizes awarded.

COLEMAN PRIZES.

Silver Medal	Mr. W. A. Byrne.
Bronze Medal	Mr. J. Beanland.
Certificate of Merit	Mr. A. Le Sueur.

SCHOLARSHIP.

£25 *per Annum for Two Years*	Mr. J. W. Reynolds.

CLASS PRIZES.

CLASS C.

Contagious and Parasitic Diseases	Mr. E. E. Martin.
Veterinary Medicine and Surgery	Mr. J. Beanland.
Morbid Anatomy and Pathology	Mr. T. Ludlow.
*Therapeutics**	Mr. J. Beanland.

CLASS B.

Anatomy	Mr. J. Row.
Histology	Mr. F. M. Hill.
Physiology	Mr. T. C. Garry.

CLASS A.

Chemistry and Toxicology	Mr. G. H. Williams. Mr. J. H. Taylor.
Practical Chemistry	Mr. J. Toms. Mr. F. W. Wilson.
Botany	Mr. G. C. Lowe.
Elementary Anatomy	Mr. J. H. Taylor.

The prizes which have been awarded may be received by the gentlemen to whom they are awarded on applying after the meeting.

* For the Therapeutics Prize of last year, 1888, Mr. Bush and Mr. R. W. Knowles of Wisbech were bracketed equal, but by mistake the latter gentleman's name was omitted.

Professor BROWN (Principal) said: Gentlemen, a word by way of concluding these proceedings, which we always endeavour to keep within reasonable limits, being ourselves firmly convinced that one is not permitted to waste time, because it is the stuff that life is made of; and we are further also believers in the maxim that "brevity is the soul of wit," and certainly you will agree with me in that respect, Dr. Yeo's address was a model of witticism. He was good enough to give us a very great deal in a very small compass, and we must look forward to the opportunity of digesting some of his sentences when they appear in the public press. My present duty is to ask you to do what you will with great readiness perform, give a vote of thanks to Colonel Sir Nigel Kingscote for his kindness in taking the chair to-day. Colonel Kingscote is no stranger here. As you are aware, for many years he has been one of the Governors of the College; but to my mind his qualification in that respect shrinks into comparative insignificance in face of the fact that he comes here as a representative agriculturist. I do not intend to take up your time by dilating on this or any other topic now, but I hear constantly that our ranks are being overcrowded, and some of your friends, your fathers and brothers in the profession, do not hesitate to say in their discussions at the medical societies that the examinations must be made more severe with the result of keeping many candidates out of the profession. Whether that method, which comes from yourselves recollect and not from us, is the right one or not, I do not pretend to say; but you may depend upon it that if you will take the trouble to do what you never, as a profession, have yet done, try to get the confidence of the agricultural community, you may double your numbers and increase your gains in proportion. But so long as you will insist on concentrating yourselves upon your equine patients, and sternly maintaining that distinguished title with which you began, viz., that of horse doctors, you will overcrowd your profession without the smallest difficulty. But, with between forty and fifty millions of stock in the United Kingdom alone, it is idle to talk about your very small ranks furnishing a specimen of overcrowding. On this account, gentlemen, we specially welcome Colonel Kingscote here to-day, because he knows perfectly well that what I am now telling you is literal truth, and that the great aim you should have before you is to associate yourselves as much as possible with the owners of this stock, whose diseases have not yet received one hundredth part of the attention which they undoubtedly merit and will some time or other have to receive. I ask you to give a cordial vote of thanks to Colonel Sir Nigel Kingscote for his kindness in taking the chair here to-day.

The CHAIRMAN.—I am extremely obliged to the professor for the kind way in which he has proposed this vote of thanks, and to you, gentlemen, for the way in which you have received it. It has been a very great pleasure to me to come here a second time, for I had the honour of taking the chair here at a similar gathering on a previous occasion. I assure you, as a Governor of the College, I take a very great interest in it, and I try to interest other Governors to do all we can to make it as efficient as possible. We have got no long pockets at our backs like other societies of this sort, and I am afraid if we even went to the new Minister of Agriculture he would turn round upon us and say he was unable to help us. I hope, however, we may get help in other ways. I would also ask you to take to heart the few words which Professor Brown said to you and to the profession generally, and endeavour to get that knowledge of cattle and sheep which I believe you have pre-eminently obtained as regards horses. I will not speak of the humbler animals perhaps, but agricultural animals are, on the whole, the most valuable stock in the country. I thank you very much for the reception you have given me.

Professor BROWN.—I would remind you that we shall go on to-morrow in full work. There is no more time to play.

The proceedings then terminated.

GLASGOW VETERINARY COLLEGE.

THE winter session of the Glasgow Veterinary College was opened on 1st October, by an introductory lecture delivered by Professor Limont, M.A., M.B., in presence of a large number of students and others interested.

Principal McCall occupied the chair.

Among those present were Professor McKendrick, Glasgow University; Principal Williams, Edinburgh Veterinary College; Dr. Morrison, Free Church College; Mr. Campbell, V.S., Kirkcudbright; Professor S. Charteris, Glasgow University; Rev. Mr. Scott, Bargeddie; Dr. Willis, Baillieston; Dr. Carmichael, Glasgow; Dr. Russell, Glasgow; and Professors Cooke and Ferguson, Glasgow Veterinary College, etc., etc.

Professor LIMONT said—

GENTLEMEN STUDENTS,—It falls to me to bid you welcome, and play the leading part in the academic function known as the Introductory. Every school has its victim, and about the 1st of October his voice is heard in the land. The tones vary, but the burden of his song merely oscillates. He has a special subject in which few take special interest—or he has no subject, but devotes himself to the interesting objects on the benches, and especially to those on the back benches. To new comers the city may not at first suggest academic groves. But I assure you that this is a city of colleges and professors—especially professors—and that plain living is remarkably cheap. I am afraid, however, that it is also held cheap! and that hard thinking is not so common as it ought to be. You will be charmed to hear that we have got our own Girton, where they do not always study the

> "Quadrant—and the anemometer;
> and oh, that darling, darling dumpy-level."

And on the banks of the ancient Molendinar a college is said to have reared its head, in spite of the sad truth that some colleges do not rear many students. So far they have not appointed a rival set of veterinary professors. But I have had thoughts of dropping the title of professor in fear of being included in dreadful statistics, such as those of the percentage of public-houses in the population. On second thoughts I have resolved not to. We still get good classes here.

You are no doubt proud to be veterinary students. But you are not the men of the old days. This is pretty certain. Some of the fathers, however, consider you to be a very poor lot. But I think their judgments are too sweeping, as they are not based on their mellowed remembrance of the students of old (including, of course, themselves) compared with a naturally more limited knowledge of the students of to-day? But there is truth in what they say, and I shall touch again upon this point. As compliments are always safe, and may be genuine, I shall say this—that after work in six medical schools in Scotland and London, and after long work with you here, I know you to be at least the equals of medical students of the better class. In this college you must submit to discipline in the matters of study and examination. I used to harbour an old Edinburgh prejudice against this. In Edinburgh rival teachers lecture on each subject, and a student goes to the man he fancies. This fancy is pretty much all there is to keep him at work, and yet the system works well. But it is possible only where there are many men with plenty of money. There are only two such medical

schools, Edinburgh and Cambridge. And evidently veterinary schools of this kind are out of the question. Our college is more like an individual college in Oxford or Cambridge, and in it discipline is both possible and desirable. I have a word for the men who come to us after a term of pupilage. They have got some good and some harm from it. Everything depends upon their courage and determination during the first weeks of term. They must get to work, and try hard to recover certain powers and habits of study lost in the gap between school and college. They must try to get hold of the scientific spirit. They must read harder than other men, for they have lost the school-boy power of cram—and even the best of men have something to cram. If they set steadily to work they will reap in due time the benefit of their experience. If they don't they will not come to much good. Beginners have but three years of study before them—at least they hope so. This is said to be, and may be, too short a time. But it is long enough to reach the standard of the examining board. The worst of it is that men have not time to get outside the beaten track. Good men do not get enough freedom of study. I may add that sometimes worthless men do not get time to come out in their true colours. They get into the profession and can't get out of it. The curriculum might well be lengthened. No doubt professions should be open to all in a certain sense; but only the fit must be allowed to enter. It is idle to try to raise a profession by raising the examinations alone. It is difficult to get examinations both good and stiff, and then the public won't stand it. The time test and the money test are not to be despised. Good candidates have almost always a turn or a love for their future profession, and they naturally fall into two classes. In the first are men of brains, birth, and money; in the second men of brains, no birth, and very little money. The former make good students if they use their money without abusing it, the latter do quite as well when they pass through the ordeal of earning the money they need for a proper course of study. I suspect that it is the memory of men of this class that so prejudices some of the elders against our students. A typical poor candidate is a commonplace lad, designed by his father for a profession, and sent to the veterinary because it is the cheapest. Sometimes such a lad honours his father's frugality and self-denial, works hard and does well. But he and his compeers are in no sense a picked set of men, and are weighed down by many disadvantages. In any profession the worst candidates are perhaps the men that have no money, don't earn any, and yet get through the portals—to the lasting injury of the profession. Of course I do not include in this class men who win money in real and open competition. But some professions are much injured by endowments. Some time ago a clergyman in England told me that the Scotch medical men in his country were a contemptible crew. I did not deny it, but I told him that the younger ministers of his Church were a very poor set compared with the men of five-and-twenty-years ago; and I told him why—that they had cut down the curriculum, and issued showers of sham competition scholarships. He did not directly deny it, and after some talk remarked—by the way he is a well-known radical—"*After all it seems that the money test is the best?*"

You will have some trouble with books; text-books are good, bad, and indifferent. The good are scarce, and the indifferent are worse than the bad. It is probably useless to protest against the unknown language in which most of them are written. But we should boycott one variety. These books are very big, and seem to have been flung together by all the winds of heaven. The authors must have ceased to ruminate, owing to severe indigestion. To heap together masses of crude, doubtful and incompatible material is perhaps all that the authors can do—*Necessitas non habet leges.* But I do not see the necessity, and I protest on behalf of Her Majesty's

lieges. Students are not carnivorous, often not even omnivorous, and they can't swallow such tremendous boluses. Reviewers can't be compelled to read books, but I wish we could make them bolt one or two that I know, and that not as young ladies devour novels. I doubt, however, that they could not be got down either way.

You will soon hear the voice of the "practical man" and become accustomed to his perennial objections to "theory." Be practical by all means; get a mind-picture of things by using your senses upon the things themselves. Don't depend upon a second-hand picture got with the ears alone, or with the eyes from a bad wood-cut. But be theoretical; it is purely by a matter of theory that any two sides of a given triangle taken together are greater than the third side. If a practical man comes to you with a measuring-rod, and says that this is not true of a certain triangle, tell him quietly, but firmly, that you prefer to trust to theory.

Nobody is so theoretical as the practical man; and often his theories are not less absurd than, say, a theory that a moustache, like the "evil eye" of the devout north, has a malign influence on the behaviour of harness-horses. Such a theory might be of some service in the selection of a new set of post-boys or 'bus-drivers. But it would hardly serve in the separation of the good from the bad whips in a cavalry regiment. If, acting on his own theory, the practical man ever gets good results, he is sure of its absolute infallibility. The fame of many a Court physician rests on little more than a few trumpery theories that he pushed until they got the books. There they are apt to stay for a long time, just because people get used to the sight of them. We cannot do without theory. Ten years ago Sir Joseph Lister, once well known in this college, had just triumphed. Aseptic surgery had, in his hands, done away with almost every danger of operative surgery. I worked for a few years under him, and under the best of his disciples, at a time when his old opponents were changing sides in shoals. His own students, when they devoted themselves to surgery, almost to a man resembled their master—they were fuller of the theory than the practice of every detail of a complicated system; and so were some outsiders. But many cared for nothing but the practice, or nothing but the practice and the theory of the action of bacteria. The theoretical men generally succeeded, but I cannot remember one practical man that did not fail, and as a rule they miserably failed. And yet I am told to-day that Sir Joseph Lister's teaching (of that time) as to inflammation, the healing of wounds, and other matters, involved theories that must soon be abandoned. But the theories he held were good ones, and have done splendid service in their day and generation. And so did the old corpuscular theory of light, though it is now abandoned. You can hardly be too much men of science, but let me give you one or two warnings. Do not be too much puffed up if you happen to pass a brilliant examination. I do not say that a man is not a physiologist because he has only heard or read of the observations and experiments of others, because he has only followed the reasonings of other men. But remember that you do this only in a very limited and imperfect way, and that very often you do not do it at all, but merely accept the conclusions of others. This knowledge of results is very useful no doubt. But it is hardly science. Faithful students of the sciences that deal with *things* are less likely than others to fall into the meaningless "cant," so common amongst educated men when they come to deal with matters outside their own province. But don't begin to mouth and vapour about the "tendency of modern scientific thought" whenever you get badly cornered. Try to be always sure of your own ignorance. Some men are cocksure of what they know; others are surer of what they don't know. The latter frame of mind is the better, and does not prevent you from being very confident about the ignorance of other people. If there is room at St. Mungo's

for yet another, I should suggest the appointment of a Professor of Ignorance. He might read the prayers of the college—

> "O wad some power the giftie gie us
> To see oorsels as ithers see us."

This is in more senses than one hardly Scotch. I never knew a Scotchman wish for such a power, and I don't think many of them would take it as a gift, though, like others, some of them want it. Again, science will not take the place of other knowledge. Let us admit that physiology teaches that a horse in hard work is best fed a certain number of times a day. It would be very foolish to insist upon this practice in every case. Clients must think of convenience and of men's wages. But your scientific knowledge will enable you to recognise, quicker than the owners, that a particular stud should get, let us say, one more meal. Beginners are apt to bring thoughtless discredit on science, not because they are ignorant of it, and not because science is at fault, but because they lack every-day worldly knowledge. One point more. Do not undervalue the *dicta* of unscientific, but able and experienced men. They have been making rough observations and experiments all their lives, and reasoning upon them after their own fashion. This is really a rough kind of science, and often there is no better available. In practice it must be added to more pretentious science. No man will ever learn to stitch wounds properly unless he make a great many experiments with a needle and wire. But he had better lessen the need for these experiments by first studying pathology. In one matter veterinary students are fortunate. They get at once to "the bones," and for the first time learn to see. In another they are very unfortunate. During the first year one-third of your time should be devoted to anatomy, and two-thirds to physical science. This is the grandmother science of all the sciences that deal with dead or living things. And were our sciences perfect they would be wholly exact, and but branches of physical science. To teach men modern physiology and pathology while they know little or nothing of physical science, is to make bricks without straw. It is such a pity that veterinary students cannot make a scientific study of the horse as an exquisite engine built up of a number of machines. It is pitiable to read chapters on draught, harness, the conformation of the horse, animal mechanics, and so on. It may seem incredible, but it is true that there are pages in notable books dotted all over with such words as force, energy, weight, impulse, every one of them wrongly used. The result is, of course, that people have the most absurd ideas on these subjects. And the language in which some of these ideas are expressed can only, I think, be surpassed in absurdity by the average reporter's account of a railway collision. Some day this will be put right. But I hope we shall never have the medical plan of a preliminary examination in so-called "mechanics." I thoroughly agree with Dr. McKendrick that this is worse than useless.

I am not going to indulge in the favourite pastime of abusing the examining board. It isn't quite perfect, and I don't think that it ever will be. If I don't grumble, you need not. On the whole you are safe to get credit for faithful and fairly hard work. Sometimes a man gets rather hard lines, but, on the other hand, sometimes another gets too much credit. This is inevitable at all examinations. Safety lies only in steady good work. Every man that entered the senior Anatomy and Physiology classes last October passed last May, simply because work was the rule. I have many a time given the key and the combination; but I have not always got students to follow the instructions. When they don't, only one result can follow. The range of the examinations in my subjects is quite fair, and I for one do not want it cut down. If men are fit to be taught up to a certain point, it is terribly tough work to teach them to a point much below it. They despise

the examination (and the examiners), and take no interest in the subject. They trust to "orals" and a wretched little "grind book." Then they get plucked, and people who do not know much about these matters think that the examination must be searching and severe. I am more anxious to have good than easy examinations.

One part of your duty to the public will be to give evidence in their behalf. This will need more brains, knowledge, and wisdom than the duties of practice. Experts ordinary and extraordinary are now-a-days sorely abused. They are denounced as advocates; and because they differ doubt is thrown upon the reality of their science and art. But engineers suffer this reproach quite as often as other experts, and yet the Forth Bridge and the Eiffel Tower are realities—in spite of the old Tay Bridge and the Tower of Babel. This imputation of discreditable advocacy is hardly fair. It is a pity, no doubt, that experts are so like advocates—but are they to blame for it? Why, they can hardly be anything else. Let us suppose that the solicitors on both sides have decided upon the experts to be called. Are any chosen but men ready with a strong case that hangs well together? any with doubts? any willing to admit something that tells against their opinions? If the choice lay between two men, has it fallen upon the more just and reasonable and learned, or upon the unscrupulous, plausible, and dogmatic? Experts are men, and differ like members of the House? Now, what kind of agreement can there be between ten of the New Radicals and ten Tories of the old school? We don't, as a rule, scoff at the doctrines and refuse the teaching of the Christian Church because Cardinal Manning and Mr. Spurgeon do not exactly agree. Suppose that an expert is not dispensed with at the last moment, because dangerous to "his own side." Let him get into the box. Does he get a chance to tell the truth, the whole truth, and nothing but the truth? He is allowed to tell his own story, and he won't be allowed to tell the "whole truth" if counsel can stop him. Nor will he get much help from judge and jury. If cool, ready, and determined, he may manage to edge in or blurt out something the court ought to know. But the result is, he gets hostile treatment from both sides; that two sets of skilled counsel—armed with almost unlimited power of insult—do their best to make him smart for something he has said. And in future he is not likely to be in great request as a witness. Nor is it to be forgotten that many experts are born advocates, and that in a keenly fought case they are alternately tempted and goaded into showing it. Some change must be made, if there is to be fair play for prisoners and litigants—not to speak of experts.

As a matter of fact, however, science and art are cruelly misrepresented by so-called experts. Let me quote the first part of article 49 in Sir James Stephens' "Digest of Law of Evidence."

He says: "When there is a question as to any point of science or art, the opinions upon that point of persons specially skilled in any such matter are deemed to be relevant facts. Such persons are hereinafter called experts. Taking Art. 48 along with what I have quoted, we find that the opinions upon these questions of *experts only* are to be deemed relevant facts, or as we commonly say, 'taken as evidence.' Now let me quote the remainder of Art. 49. The words 'science and art' include all subjects on which a course of special study or experience is necessary to the formation of an opinion. It is the study of the judge to decide, subject to the opinion of the court above, whether the skill of any person in the matter on which evidence of his opinion is offered is sufficient to entitle him to be considered as an expert." Now I ask how many of the witnesses in recent notorious trials had any right to be considered experts upon the points in question, or upon any subjects whatever? This grievance is made worse by the fact, that the public don't know how much it is in the power of a witness to have a long parade of his

knowledge or ignorance, both in court and in the newspapers next morning.

Another subject of interest to you is that of public health. The art of protecting the public health is coming to rest more and more upon a real pathology common to the sister professions, and day by day medical men and veterinary surgeons are being pressed into the service, directly or indirectly. Let me plead for wisdom—I will not say common-sense—in this matter. I object strongly to premature advances and ill-judged "rushes." Practical measures are not to be decided by pathology alone. Put yourself in the position of the public, and consider what they (very rightly) consider. The vast majority of the Glasgow folk get but a fraction of the air-space they ought to have. But does any one in his senses propose to have this put right at twelve months' notice? Why, an idiot ordaining this would cause a revolution; the change must come step by step, and in line with other reforms. Decency is worth more than a drop of two per thousand in the death-rate. Let us get rid of one-room houses, and for the time, be not too particular about cubic contents. We do not live to breathe. In practical work for the prevention of disease, whether in home or homestead, we must be men of the world, as well as pathologists. It is not strange that bacillus panics should sway the public to unreasonable demands, but scientific men should surely keep their heads. They don't always do so, however, and sometimes they seem to perform the remarkable feat of losing them on purpose. Now it is slums, now milk, now meat. Extravagant demands are made, and sometimes, but not often, yielded to. Then the excitement suddenly dies away, and is forgotten in a week or two. A few weeks ago we had a practical commentary upon what I have been saying. We got a cow from a dairy. Her udder seemed perfectly healthy, and her milk was all right to look at. But this milk swarmed with tubercle bacilli; and when she died we found tubercles in almost every part, though not in the udder. For months tubercular beef has kept the whole community in a ferment, money and ink have flown like water, and the public are now, it is said, being very much protected against it. I hope they are not protected upon the principle that the flesh of all not perfectly healthy animals is dangerous, or upon the principle that the very slightest danger is enough to warrant condemnation. The profession had better beware of such principles. I once heard a brilliant physician uphold the action of the Society for the Prevention of Cruelty to Animals, on the ground that no lame horses should be allowed on the streets, whether it hurt them or not, *because it wasn't pleasant to him to see a lame horse!* But during the past six months, we have heard little about the infinitely more dangerous milk, and, unless I am mistaken, the means of protecting you from a few thousand bacilli in a glass of it, are not by any means so potent and direct as the measures levelled against a stray bacillus in your beef-steak. However, some day scarlet fever will break out in a fashionable quarter. Somebody will discover a new disease in the sore teats of a cow, and milk will become fashionable once more.

And now, gentlemen, I must end this rambling discourse upon threadbare topics. It is the custom on such occasions to give you some good advice. I am not going to preach to you, for I have little sympathy with the spirit of the cry, "Here's a young man—let us out and preach at him." But I may say a little; your chief end and object must be your work; let your relaxations be such that they bring you to it brighter and fitter. A good novel, a good poem, play or sermon, will at proper times do you all the good in the world. Read, sometimes, real and realistic history, not the trash that wearied you at school. A night with Clive in India, or with Cromwell against the King, will bring you all the fresher to your work in the morning.

I would not have you on the grindstone every night of the week. Most of you cannot hope to see much of men and manners, good men and good manners, outside. Make the most, then, of your fellow-students, and get at least some of the advantages of travel. Every country and every county has its strong and its weak points. The calm and just pride of Englishmen in the splendid history of their people is often tinged by too great a sense of personal merit in not having been born a Russian or a Turk. Scotchmen, because at present on the whole at least equal to Englishmen, are apt to think that they are ahead in everything, that they always were, and that they always will be. Irishmen—well, English and Scotch used to agree that the doctrine of Original Sin applied, and with peculiar force, to the Irish. But to know them, as I have learnt to know them here and elsewhere, is to know better. Try to recognise and imitate the good points of your neighbours. Find out the weaknesses that you share with your countrymen, and avoid them. You will improve—and York, Canterbury, and Cornwall, Scotland, Wales, and (more or less) United Ireland will still preserve their characteristics. I am afraid you must go without the gentler companionship. A student must dally over his work never, and with young ladies only in summer, when these lapses do not so much matter. You can comfort yourselves on Sundays by hearing that this is one of the cities of the plain.

I do not ask you to forswear "cakes and ale." In the first place, I know that you won't. In the second, I do not want you to do anything of the kind. But enjoy them soberly and in reason. Nor am I going to specially enjoin upon you the practice of the more smug virtues. For this is no place to denounce the more smug vices. Be good men and good gentlemen. Let your life in the free student-land of Bohemia be simpler, braver, and purer than the lives lived in Philistia. Grow into gentlemen as you grow into men —gentlemen, the same before high and low, rich and poor—men, afraid of nothing but conscience and your God.

NEW VETERINARY COLLEGE.

THE winter session of this College was opened on the 2nd October with an address by the Principal, Professor Williams, the chair being occupied by Charles Phillips, Esq., A.V.D.

The following veterinary surgeons, amongst others, were present: Messrs. Lawson, Falkirk; Young, Cockermouth; Elphick, Newcastle; Hickes, Market-Weighton; Kay, Lochee; Baillie, Cupar, Fife; Anderson, Forfar; Brownlee, Coatbridge; Johnston, Peebles; Morris, Orkney; Eltoft, Lancaster; Duvall, Edinburgh; Borthwick, Kirkliston; Storrie, East Linton; Reid, Leith; Aitken, Edinburgh; Young, East Calder; Rutherford, Edinburgh; Finlay Dun, Edinburgh; Connochie, Selkirk; Campbell, Kirkcudbright; Middlehurst, Liverpool; Ashton, Bolton; Love, Leith; Cockburn, Nottingham; Dalling, Edinburgh; Bannatyne, Haddington.

There were also present Professors Hunter, Lewis, W. O. Williams, McAlpine, Macadam, McCall; Messrs. Veitch, James Park, James Hope, Wilson, Skirving, Johnston, S. F. Petrie, R. S. Gray, Captain Stewart, and Dr. Hughes; Mrs. Rutherford, Mrs. W. O. Williams, Misses Gray, and other ladies. The following, together with many others, were unable to attend the opening, owing to pressure of business, etc.: The Professors of the London Veterinary College; Professors Pritchard, Cox, and Simonds; Messrs. Greaves, Manchester; Robinson, Greenock; Peter Taylor, S. Locke, J. W. Ingram, Manchester; Sir Henry Simpson, the Lord Justice Clerk, and Dr. Dreschfeld.

Professor WILLIAMS briefly introduced the Chairman.

The CHAIRMAN, who was received with loud applause, said Principal

Williams, ladies and gentlemen, I must thank you for the introduction and for the very kind reception which you have accorded me. Any little service that I may be able to render to the learned Principal of this College to-day is, in my mind, far out-balanced by the honour which he has conferred on me by his kind invitation. It is with great pleasure and with feelings of duty, though not without hesitation, that I take the chair—pleasure in being in any way able to support my learned friend, feelings of duty as a member of the profession in being able in any small way to assist him in the good work which he is performing, but, ladies and gentlemen, with some hesitation when I think of the very long list of friends which he had at his command when he selected me from the list, and also remembering my distinguished predecessors, also members of the profession, also those not of the profession, who have so ably carried out the duties of the chair. We have all met here to-day within the walls of this College to be present at the opening of its winter session—of, I believe, the seventeenth winter session—to show by our presence the interest which we take in the success of this particular school, in the advancement of veterinary science, and from that advancement in the benefits which must be conferred on the general public, and also in the alleviation of the sufferings of the lower animals. Now, the chief interest on these occasions is directed to the reading of the introductory address, and on this particular occasion I think that, without disparaging the efforts of other gentlemen who may have read addresses on previous occasions, we may say we are extremely fortunate to-day in being about to listen to an introductory address which is to be read by the founder and principal of this College.

Ladies and gentlemen, without further delay, I feel I am anticipating your wishes when I perform the pleasant duty of calling upon Professor Williams to read the introductory address.

Principal WILLIAMS, who was received with loud applause, gave them all a hearty welcome to Edinburgh and that College. He was not going to make a long address to the students that day. He had made many addresses to students, but notice had not always been taken of them. His experience, however, enabled him to know and to predict that the great majority had come there for the purpose of doing honest work, some few of them to do a little work, and a very, very few—exceptionally few—to do no work at all. The poor man, as a rule, was an honest worker, but the rich man, if he had sufficient means, might do as he pleased afterwards. He urged them all to devote themselves to their work, and study and endeavour to obtain the diploma of the profession into which they had entered. There were other matters of greater interest to the public than addresses to students, and he therefore concluded his observations to them by trusting that the minority would follow the example of the majority. Within the last few months there had been departures in veterinary pathology—particular and peculiar departures. Articles had appeared recently in the newspapers —one of them being rather an expression of *opinion* than an article—which looked upon certain pathological processes as those of evolution. He was sure his friends in the profession would be surprised to hear, perhaps for the first time, that the Navicular Disease was looked upon now by some young and rather verdant veterinary surgeons as a process of evolution by which they expect that the navicular bone is to be removed altogether as non-essential and unnecessary, and they traced the process of the disease as that by which nature was now removing the bone as an unnecessary appendage. One remarkable thing that upset that theory was that such a disease was not now so common, owing to better shoeing, etc. If it were a process of evolution set up by nature, surely, by a very simple process of reasoning, the disease would be much more common now, and he thought

that theory fell to the ground. Another thing was the condition termed "Splints," which was also looked upon as a process of evolution whereby the three bones would be ultimately united. It was thought to be an indication that nature would, by-and-by, weld these bones until there was only one bone in the leg of the horse. He could not accept that. If nature intended the horse to have one bone in the leg instead of three, surely, every now and then they should find a foal born with the bones united, instead of having the painful process which they often witnessed in the formation of Splints. This theory was something like Wagner's music—the music of the future—which no one of his calibre could comprehend. A few years ago there was a good deal of expression of opinion about certain things which he hoped would turn out correct. It was publicly intimated that the operation for Roaring had proved a great success. It was a most peculiar thing that the horse was subject to this condition termed Roaring. Man was not subject to it—though some people were always roaring. In order to remove this noise, it was suggested to cut into the larynx and remove the cartilage on the left side, which had lost its function, and also to remove the vocal cord. The result was, however, not satisfactory. They were at one time told to believe it was a cure, and he had himself performed the operation on one horse which became a useful animal, but still he made a noise. In another case he operated on a hunter. He prayed for success in this case, as the horse was a very good and a most costly animal; but when the horse left him he was even worse than before. He was, therefore, sorry to say that he was not in a position to tell them that the operation had been a success.

He might refer to another matter, as it dealt with the windpipe, and that was the method of curing the disease termed "Hoose," or Husk. He might tell farmers that it could be performed by anybody having a moderate amount of skill. By a simple injection the disease could be cured, and he wished the public would take notice of this. He would be happy to show the whole process to any veterinary surgeon. He also had a few words to say about Tuberculosis, and expressed an opinion that there were various conditions which were mistaken for Tuberculosis. He agreed generally with the French Commission, that when they had Tuberculosis the evidence, so far, was in favour of prohibition, and that there was danger to human life even from partaking of the beef of an animal that had suffered from Tuberculosis. He would say, without going further, that the question deserved more consideration, and that this country should be roused from its apathy to follow other countries in instituting investigations into these questions which involved the national wealth and well-being of the people. He thought the *Scotsman* might perhaps have some influence with the Government if it took the matter up; but the *Scotsman* never took any notice of his remarks. The *Scotsman* said he had a "private institution." He once represented a public institution; but all their colleges were alike. They were all on an equality. The London College was governed by governors elected out of subscribers, and the Dick College was governed by the Town Council—or rather by a gentleman in the Town Council who drove the worst pair of horses in this city. If the *Scotsman* treated all private and extramural teachers alike, and did not report the lectures of one while ignoring the others, they would not grumble. But he had been boycotted by the *Scotsman*.

He would next touch upon the major subject of his address, and this was the question of Pleuro-pneumonia. Several letters had appeared in the *Scotsman*—some good and some bad—and various suggestions were thrown out as to how we ought to deal with Pleuro-pneumonia. It was an admitted fact that since the slaughter order had been put into force the disease,

instead of diminishing, had increased, and cost the country an enormous sum of money. Suggestions had been offered by farmers and others as to the treatment. Some said they gave nitre, others tartar emetic, etc., etc., "and they got better"! Did the public think that veterinary surgeons had not tried all these? For twenty-five years he had treated thousands of cases of Pleuro-pneumonia, and tried all the remedies of the Pharmacopœia. They did not all die—at least from 40 to 50 per cent. recovered. It was not so very fatal as to destroy all, but they tried everything, and when animals so cured were introduced into a herd others took it. The apparently recovered animals had the products of the disease in their lungs; the disease continued in the herd, and could not be got rid of. They had tried all kinds of treatment, and were not to be taught by amateurs how they should deal with the disease. Then they had investigations into the nature of Pleuro-pneumonia by two amateurs. One of these had promulgated the theory that it was a species of Bronchitis. Dr. Woodhead also described it as Bronchitis. The two diseases, however, were entirely different, and Pleuro-pneumonia had no connection with Bronchitis. They had another proposal from another amateur: it was that Inchcolm should be converted into a sanatorium for the purpose of dealing with Pleuro-pneumonia. If this professor of surgery knew anything about Pleuro-pneumonia, he thought Inchcolm would have been the last place to select. Would some gentleman recommend Inchcolm for chest diseases in the human being? It seemed an absurdity that any local authority should countenance a proposal of this kind. Why choose an island? The spread of Pleuro-pneumonia was very limited; they did not want an island. Further, the vaccine of Pleuro-pneumonia had been isolated years ago. It was discovered in 1851. The lymph which was obtained from the lungs might be modified, and he made a proposal to the Highland Society three years ago in regard to it. Local authorities were willing to spend money in discovering—what? What had already been discovered. Then another writer—a farmer—said that veterinary surgeons knew nothing about Pleuro-pneumonia. Therefore, when the Highland Society instituted a commission to take evidence as to Pleuro-pneumonia, he himself, who was veterinary surgeon to the Society, was passed over, and the man appointed to conduct the investigation was their chemist. What did a chemist know about a cow, or a cow about chemistry? They knew this, then, about Pleuro-pneumonia; they knew that in 1693 Valentin described it; Jacob Scheucher described it in 1732, Mauchard in 1745, Kauch in 1778, Haller in 1773, and Wirth in 1713 described the disease in Swabia. In 1854 it was investigated by a French Commission, of which Majendie was president, and Reynal secretary, and having amongst its members the illustrious Bouley, Rayer, Delafond, Yvart, Renault, Lassaigne, Baudemot, Doyére, De Morny, and others. It had been further investigated by Hering, Hertwig, Bollinger, Ercolani, Corvini, Didot, Gamgee, Simonds, Reviglio, and Dr. Willens, who, in 1851, suggested and carried out inoculation with the virus as a preventive of the disease. He met with some encouragement and much opposition. Reviglio, a Piedmontese veterinary surgeon, published a memoir at Turin in favour of it. Professor Simonds wrote against it, and the French Commission confirmed Reviglio's views. Gamgee introduced it into Edinburgh about 1860, but owing to a want of knowledge in the collection of the lymph, the result was bad. He introduced a needle into the lungs of the dead animal, and then inoculated the lymph into the tail of the living. The greatest care requires to be taken. In 1865, Bouley, during a visit to investigate the cattle plague in London, found inoculation commonly practised by the London dairymen. It was again introduced here by Rutherford, and it was practised now. Seeing that they had such a literature, with so many authorities, extending

over two hundred years, they must really plead not guilty to the charge made against them, that they knew nothing about the subject. Let them now refer to what had been done in other countries to eradicate the disease, and benefit by the conclusions of the investigations. In France inoculation was compulsory, but was never performed until after the outbreak of the disease, and therefore the results were variable, for after a three months' quarantine of the inoculated cattle all restrictions against the dispersion of such are removed, and consequently Pleuro, though diminished, still remains in France. It had also been discovered that 11 per cent. of the inoculated animals died from Pleuro. This proved that the animals were not carefully selected, or that the operation was improperly performed. In Holland inoculation was made obligatory by law in 1878, and losses were indemnified in full. In 1878 and 1879, 148,000 cattle were inoculated, out of which 1,385, or about one per cent. died. By wholesale slaughter in isolated places and slaughter of the disease and obligatory inoculation in dense bovine centres—such as the great distilleries—branding of the inoculated, and the prohibition of the removal of fat beasts without authority from the Government veterinary surgeon, after which they are sent to the butcher and to foreign markets; the same permission being rarely granted for milch cows. Indemnity is given in full for suspected, and one half for diseased; and two million francs have been thus paid in one year. By these vigorous measures the loss has been reduced from 20,918 diseased and 4,383 suspected during the seven years prior to 1878, to 1,265 diseased and 8,400 suspected in the ten years including and succeeding 1878. The number of diseased animals fell from 701 in 1878 to 2 in 1886 and 1 in 1887, thus showing an average of 3,000 diseased annually prior to 1878, and only 126 per annum after 1878. In Belgium they advocate immediate slaughter of the diseased animals only, and after a short quarantine the others may enter the markets. Inoculation now forms a part of the legal measures adopted for the suppression of the disease. In 1882 those attacked amounted to 1,293, while in 1887 they were reduced to 830. In Denmark there is slaughter only and no inoculation. Six times the disease imported from Sweden and England has been promptly extirpated. Sweden and Norway are like Denmark. In Austria there are only half measures. In this, as in most countries, "suspects" are allowed to be killed for diagnosis. Inoculation is only permitted in already infected byres, by consent of the Government veterinary surgeon, at the owner's risk. No indemnity is paid by the State, but by an association. The disease is now gaining ground. The losses in 1878 were 1,400, and in 1887 4,648. In Scotland, in the majority of the districts prior to the "slaughter order," the loss was small, as inoculation being resorted to, only a few animals were killed. Since the "slaughter order" most districts in which the disease has appeared have suffered heavily. Owing to the kindness of many of the "clerks of supply" and "clerks to local authorities," to whom he now tendered his best thanks, he was able to state that twelve districts in which disease prevails paid for the working of the Act prior to the Slaughter Act £7,800, and since the Slaughter Act came into force £27,000. Now, did inoculation introduce the disease? Upon this point there were differences of opinion, and neither side had as yet produced conclusive evidence. The Congress of Paris were now unanimous that it did not, but there were many who from experience have arrived at a different conclusion. In South Africa several outbreaks have been—or are supposed to have been—traced to inoculation, and in order to determine this point he would suggest fuller investigation. All observers were unanimous that cattle that had passed through the inoculation fever do not communicate the disease, and the only question is, Do they, or can they, transmit it whilst the virus is in active operation?

Again, For how long a period did inoculation give immunity? This was not known positively, but in our own experience no outbreaks had occurred upon the introduction of fresh cattle two years after the original stock had been inoculated. The virus was generally obtained from a diseased lung, but there were methods of cultivating it in large quantities and in a perfectly pure condition, and it would be needless to have an exhaustive investigation for obtaining a so-called pure vaccine. Inoculated animals resist a second and more virulent inoculation. Bouley and Willes proved this in ninety cases, whereas in thirty non-inoculated cows inoculation in dangerous regions, such as the breast, resulted fatally in every case; and the same experimentalists proved in six cases that intravenous injection of lymph gave immunity against hypodermic injections repeated one, two, three, and four times; whilst in three unprotected animals hypodermic injections had fatal effects. It had been found that slaughter of the diseased, segregation for a time, and after dispersion by exposure in markets of the non-affected uniformly gave bad results. Now, what were they to do in this country? His opinion was that they should kill all the diseased animals, inoculate all the healthy ones, kill every one that did not take the inoculation fever, giving indemnity from the public funds; that all inoculated animals should only be sold for the butcher; that so long as one animal in the herd had been in contact with the diseased, no animal from that herd should be sold except for fat. All animals introduced into a herd of this kind should be inoculated immediately as a precaution. After all which had been in contact with the actually diseased are slaughtered, the restrictions might then be removed. All byres to be disinfected before they are re-stocked. He thought that we should thus, in course of time, be able to suppress the disease equally as well as by the present very expensive and destructive method.

The CHAIRMAN: Ladies and gentlemen, I think you all cannot but agree with me that we have just listened to a most learned and interesting address, and that our best thanks are due to Professor Williams for the very able and careful manner in which he has brought several matters of deep interest to our notice and for our consideration. It is with hesitation that I attempt to make a few remarks on the points of interest in the address, not that I disagree in the slightest with the views and opinions of my learned friend, but that such points require most earnest and careful study. I can never consider the questions of Tuberculosis and contagious Pleuro-pneumonia without wondering why at the present the government of such a country as ours appears to be taking no part in giving any pecuniary aid, as far as I am aware, to veterinary research. When we have veterinarians differing in opinion as to whether the flesh and milk of cattle affected with Tuberculosis should be used as articles of diet by the human race, and as to the beneficial effects or otherwise of inoculation for contagious Pleuro-pneumonia; when we find these differences of opinion amongst members of our profession, I think the time has arrived when Government should be asked to give some pecuniary aid, and that such aid should take the form of annual grants to the different recognised veterinary schools in our country for the sole purpose of carrying on veterinary research. Our profession, now nearly one hundred years old in this country, has a first claim to the pecuniary aid as mentioned.

With reference to the theory of evolution, although of deep interest, it is rather, I think, often a source of amusement than a matter of serious consideration to many of us. Some gentlemen are of opinion that the frequent occurrence of disease in one part of the body, such as the formation of Splints, the disease of the navicular bone, points to the fact that in time the process of evolution will remove what we at present know in the horse as the two small splints and the navicular bones. I cannot believe to that extent in the

theory of evolution. I am led to ask in the case of disease of the teeth in the human subject—is the same theory to be continued? are we to believe that in time the process of evolution will produce human beings without teeth? If so, we may, I suppose, expect in the far future that toothless veterinary students will be attending colleges, and looking with deep interest in the museums at specimens of splint and navicular bones said to have been present in the horse at some fixed period.

With regard to the operation for Roaring, it is somewhat dangerous ground for me to tread upon. Dr. Fleming, the head of the department to which I belong, appears to take up the question keenly. It seems to me a matter for regret that the correspondence was first started in a daily newspaper and not by a communication to our professional journals, but although he may have appeared to act somewhat selfishly, we cannot but admit that he has worked with great zeal for the benefit of the profession. We have learnt that the two cases mentioned in the first letter to the daily newspaper as having been cured have since been found, and stated by Dr. Fleming himself, in the VETERINARY JOURNAL, not to have been cured, also that the operation has been much modified. The statistics given by Dr. Fleming lead us to believe that the operation, as carried out under his direction, has been a great success in the Army; but on the other hand, I have to state that of late rumours are afloat that the success is not continued, that many of the horses operated upon, although apparently cured for a certain time, are as bad roarers as they were before the operation. I am, therefore, afraid that as far as Government horses, racers, and hunters, are concerned the operation will be of no service, but simply useful in cases of draught animals affected by Roaring to such an extent as to render them utterly useless.

I will not detain you with any further remarks, but conclude by wishing continued success to this College. I hope that in time the young gentlemen now engaged in study may join the veterinary profession, encouraged as they grow older by the example set them by their present learned instructors.

Mr. FINLAY DUN, in proposing a vote of thanks to the chairman, said, Ladies and gentlemen, I now ask you to bring this interesting meeting to a close by joining me in giving a cordial vote of thanks to the chairman for the manner in which he has conducted the business of this afternoon. Mr. Phillips is a good specimen of that band of educated gentlemen, who are in the Army veterinary department and carry to the remote corners of the earth some of the traditions and a great deal of the knowledge and information acquired in the class-rooms of the colleges of this country. Not only do he and others in this department carry the information far and near, but also in their investigations in various countries they have contributed very largely to our knowledge of a number of diseases, and we may expect still greater results from the investigations of this department of the veterinary profession. Besides, Mr. Phillips' coming here to maintain, as he has done, the position of Chairman at this meeting, ought to be an encouragement for a number of you to qualify, as he has done, and enter the Army and study this important scientific branch of the public service. I am sure you will join with me, therefore, in according a most cordial vote of thanks to our friend, and also in thanking him for the way in which he has performed his duty in the chair.

The CHAIRMAN, in replying, said, Ladies and gentlemen, I simply rise to thank you very much for the kind way in which you have received the vote of thanks proposed. I may observe that it is with great pleasure I have found myself able to come here to-day, and it will always be with great interest that I shall watch the continued success of this particular school.

LANCASHIRE VETERINARY MEDICAL ASSOCIATION.

THE usual quarterly meeting of the above Association was held at the Blackfriars Hotel, Manchester, September 19th.

Present: E. Faulkner, President; Messrs. Peter and W. A. Taylor, T. Hopkins, S. Locke, W. Dacre, J. Moore, J. B. Wolstenholme, Thos. Greaves, Jas. Ingram, and Peter Pike, all of Manchester; J. F. Carter, Burnley; J. Faulkner, Rochdale; R. C. Edwards, Chester; W. Woods, Jun., Wigan; G. G. Mayor, Kirkham; Thos. Briggs, Bury; A. M. Michaelis, Stockport; Thos. Urmson, Bolton; W. Hall, Royton; the Secretary, Liverpool; Messrs. Williams and England (students).

Apologies for non-attendance were received from Professors Williams, McCall, and Walley; Messrs. J. Malcolm, J. S. Hurndall, H. Kidd, W. Lodge, W. Hunting, and E. Kitchin.

Mr. MOORE nominated for membership of the Association Mr. George Howe, M.R.C.V.S., of Buxton.

The TREASURER announced the receipt of the resignation of Mr. Richard Roberts, late of Kendal, now of Tunbridge Wells, the distance being too great for him to attend. It was accepted with regret.

Proposed by Mr. DACRE, seconded by the SECRETARY, "That a letter of condolence be sent to the family of the late Mr. G. H. Darwell, of Northwich, expressive of the great sympathy of the Association in their loss."

The proposal of Mr. GREAVES, seconded by Mr. J. H. CARTER, "That the meetings of the Association be no more held in Liverpool," was negatived.

Mr. MAYOR exhibited a most beautiful specimen of a calculus, weighing nearly 4 ozs., taken from the bladder of a filly. A most interesting discussion followed as to its character, peculiarity, etc. It was determined that a scientific examination should be made of it by an expert, and the result be announced at the next meeting, Mr. Mayor being accorded a hearty vote of thanks for bringing the specimen before the notice of the members.

Mr. W. WOODS, Jun., then read the following paper on

LAMINITIS.

MR. PRESIDENT AND GENTLEMEN,—The long-continued trade depression—which I hope we are now seeing the end of—has told its tale in many ways, amongst others upon the general welfare of the lower animals, and I am inclined to think that with the great development of the practice of preparing animals for agricultural shows, the keen competition in trade and the combined influences of over-loading, over-driving, and consequent over-feeding have caused an increase of this painful affection in many districts, and having had many cases of it, I have been induced to give more attention to it than perhaps I otherwise should have done. I do not purpose giving in detail a full description of its symptoms, course, etc., for these must be sufficiently well known to every veterinarian engaged in practice, and is therefore not called for at a meeting such as this. My object is to point out the treatment I have found most efficacious, probably to make a few remarks on certain disputed points, and to elicit, if I can, such a discussion as may be useful to us all. I make no apology for bringing so common a disease before your notice, because I think it is doubly important that we should be as nearly perfect as may be in those affections we meet with oftenest, and because the pain of Laminitis is of so excruciating a character, and the sequelæ of such permanent injury to the animal, that if we can by discussion learn something to prevent those occasionally serious consequences the night will not by any means have been spent in vain.

I hope you will not consider I am overloading you with ancient history, but I shall commence by pointing out the enormous progress veterinary

science has made during the last two centuries, for the history of the amount of knowledge and the lines of treatment adopted from time to time concerning this disease forms a staggering indictment against those who would aver that we are not a progressive scientific profession. I have been so much interested in reading some antiquated works on the veterinary art that I venture to read you a few quotations from such authorities, which have mainly led me to the conclusion that any reference to the "good old times" we occasionally hear about would scarcely be endorsed by the poor horses which had the misfortune to come under the treatment of an ancient farrier.

The oldest work I possess on the subject was published in 1623, and as the authors from whom he acknowledges to have quoted and to have followed include Zenophon and Vegetius, I think it is a fair type of the style of argument and treatment in the dark ages of veterinary medicine. The work to which I refer, by one Gervase Markham, is certainly a masterpiece. In his preface he modestly states that he publishes the work, not for ostentation, but for a lasting benefit to the kingdom, and he proceeds, "I dare boldly make this protestation in despite of any that there is not any farrier of worth that doth know or practise any well-working medicine which in this book thou shalt not find, unless he will produce some new hotch-potch of his inventing; and then the medicines herein contained shall work sooner, better, and more effectually."

I think the simplicity and modesty of this confession will be apparent to every one. I propose now to give you *in extenso* his description of inflammation of the feet. The chapter is headed—

"*Of Foundring in the Body, being a Surfeit got either by Meate, Drinke, or Labour.*

"This disease of foundring in the body, is of all surfeits the most vile, most dangerous and most incident unto horses that are daily travelled; it proceedeth, according to the opinion of some farriers, from eating of much provender suddenly after labour, the horse being then, as it were, panting hot (as we may daily see unskilful doe at this day), whereby the meate which the horse eateth not being digested breedeth evill and grosse humours, which by little and little spreadeth themselves through the member, doe at length oppresse and almost confound the whole body, absolutely taking away from him all his strength, insomuch that he can neither goe nor bow his joints, nor being laid is able to rise againe; besides, it taketh away from him his instrumentall powers, as the office both of urine and excrements, which cannot be performed but with extreme paine.

"There be other farriers, and to their opinion I rather leane, that suppose it proceedeth from suffering the horse to drink too much in his travaile being very hot, whereby the grease being suddenly cooled, it doth clap about, and suffocate the inward parts with such a loathsome fulnesse, that without speedy evacuation there can be no hope but of deathe onely. Now whereas some farriers doe holde that this foundring in the body should bee no other than foundring in the legges, because it is, (say they) a melting and dissolution of humours which resort downe-ward, they are much deceived: For it is not as they hold a dissolution of humours, but rather a binding together of corporall and substantial evills, which by an unnatural accident doeth torment the heart. Now for the hold which they take of the name of foundring, as if it were drawne from the French word Fundu, signifying melting, truly I think it was rather the ignorance of our old farriers, which knew not how to entitle the disease, than any coherence it hath with the name it beareth. For mine own part, I am of opinion that this disease which we call foundring in the body, doth not onely proceede from the causes aforesaid, but also and most

oftest by sudden washing horses in the winter season, when they are extreme fat and hot with instant travell, where the cold vapour of the water striking into the body, doeth not onely astonish the inward and vitall parts, but also freezeth up the skinne and maketh the blood to leese his office. Now the signes to know this disease are holding down of his head, staring up of his haire, coughing, staggering behind, trembling after water, dislike of his meate, leannesse, stiffe going, disability to rise when hee is downe, and to conclude, which is the chiefest signe of all other, his belly will be clung up to his backe and his backe rising up like a camell. The cure according to the opinion of the farriers, is first to rake his fundament, and then to give him a glister; which done, and that the horse's belly is emptied, then take of malmsey a quart, of sugar halfe a quarterne, of cynamon half an ounce, of licoras and anise-seedes of each two spoonful beaten into fine powder; which being put into the malmsey, warm them together at the fire so that the hony may be molten, then give it the horse luke-warme to drinke: which done, walke him up and downe either in the warme stable, or some warme roade the space of an howre, then let him stand on the bit fasting two howers more, onely let him be warme clothed, stopped and littered, and when you give him hay let it bee sprinkled with water, and let his provender be very cleane sifted from dust, and given by a little at once, and let his drinke be warm mashes of malt and water. Now when you see him recover and get a little strength, you shall then let him blood in the necke veine, and once a day perfume him with frankinsence to make him sneeze, and use to give him exercise abroad when the weather is warme, and in the house when the weather is stormy. Now there be other farriers which use for this disease to take a halfe peny worth of garlicke, two peny worth of the powder of pepper, two peny worth of the powder of ginger, two peny worth of grains bruised, and put all these into a pottell of strong ale, and give it the horse to drinke by a quart at a time, dyetting and ordering him as is aforesaid; and when he getteth strength either let him blood in the necke veine or the spurre veines, or on both; to conclude, there is no drinke nor dyet which is comfortable, but it is most sovereigne and good for this infirmity."

The following short description from a book published 150 years after the foregoing shows what little advance had been made during a century and a half. It was at this time (1755) described (I am quoting from the text) as an "Inflammation of the Intercostal Muscles which compose the fleshy parts between the ribs. It proceeds from the same cause as the intercostal, and may be known by a stiffness of the body, shoulders, and forelegs, sometimes by a short dry cough in the beginning, a shrinking when the horse happens to be handled in those parts, and perhaps when not well cured it proves the original of that distemper which horsemen and farriers call a chest founder, for when the inflammation is gone off and the viscidity of the blood and juices still remains it may be readily enough bring on such stiffness and inactivity as cannot easily be removed, and is generally known by the name of chest founder."

This very lucid description, however, was not altogether satisfactory to the veterinary scientist of that time. You would think from the foregoing description that they were not too particular as to the exact locality, provided they were at the right end of the body, fore or aft, but such seems not to have been the case, as there appears to have been for a time a lively discussion as to whether it was really the intercostal muscles or an inflammation of what they elegantly termed the midriff or skirt which was the real cause of this peculiar stiffness. They appear to have wound up the dispute in a way satisfactory to all parties, by agreeing that the one was not to be distinguished in practice from the other, from which conclusion perhaps some of us would not be inclined to dissent.

I have given you this in order to prove—if proof were necessary—that profound theorists existed even at that time amongst veterinarians, and to show that the *savants* of the eighteenth century were not behind their *confrères* of the nineteenth in quarrelling about trifles.

You may wonder how they explained dropped sole, and the feet coming off, and that this occasionally happening did not lead them to a more correct diagnosis. This they ascribed to the viscidity of the blood and juices and the stagnation produced thereby, and probably to the natural cussedness of the animal.

The gentleman to whom is due the honour of correctly locating this disease is, I believe, Mr. Blaine, for a time the colleague of St. Bell in London. Erratic enough in his own life, Blaine appears to have been remarkably correct in his observations of diseased processes, and in Laminitis especially to have brought to bear an amount of practical insight which was wonderful, considering the generally accepted opinions of the time. It is true he confused somewhat Laminitis with Navicular Disease, but his description of acute Founder is worth reproducing, as showing the great advance he had made.

He says, "Of all the definite and well-marked diseases of the horse this has been the most mistaken among the older farriers, and the least noticed among modern. I do not know a single work on the subject of farriery that does more than allude to it. I am at a loss to account for this, seeing that though not a frequent disease, it is yet sufficiently common to have been many times met with by every practitioner who has only a tolerable range of veterinary practice." Farther on he writes, "Among common farriers it has been very generally mistaken for an affection of the loins or chest, and thus their applications being made to these parts, it has usually terminated either in the death of the horse or in an incurable lameness. But acute Founder, except as being accompanied with symptomatic fever, is confined to the feet, and has nothing to do with any other part of the body, but may be defined to be an active inflammation of the internal vascuar parts of the feet, brought on by sudden translation of fever to them, or otherwise by any of the common causes of topical fever."

Now I think you will notice what a remarkable advance the language I have just read is upon the literature of only a few years previous. The reason is not that scientific medical knowledge of diseased processes generally had advanced by these leaps and bounds, but that whereas veterinary medicine and surgery had hitherto been left to ignorant shoeing-smiths and the like, it was now taken up by more educated men, including many members of the medical profession. Blaine himself had served a seven years' apprenticeship with a surgeon and afterwards two years in a hospital. Indeed, the history of the advance in knowledge of this disease is simply the history of the progress of the veterinary profession generally for the last hundred years. Blaine's treatment, too, shows a marked advance. He recommends febrifuges, raking, and glysters, "but unless there is actual costiveness, do not give physic."

It is unnecessary to say that he recommends copious bleeding; indeed, up to a few years ago the general idea seemed to be, bleed first, and then endeavour to discover what ails the patient. In addition to the general bleeding, local bleeding from the toe of each affected foot is directed, "after each foot has been well rasped round as thin as prudent, so as to relieve the pressure of the horn on the internal swollen parts." (This is very much akin to the very latest treatment recommended by Prof. Smith, *i.e.*, scoring the crust.) Afterwards poultice with cold poultices and use Goulard's extract as a lotion to the feet. Allow the horse to lie down as much as he will. Do not proceed to exercise until the feet have gained some firmness. This last advice is not

strange when we consider that the soles were pared so thin and bleeding at the toes was a *sine qua non.* Now this description marks, I think, the greatest advance in treatment that could well be made at one jump. It is scientific and practical, and although we have now ceased to pare thin the soles, it is only because such paring was found to favour the dislocation of the os pedis, and so to produce a state of affairs sufficiently serious to necessitate the abolition of that form of remedy.

The next advance in treatment is in the recollection of many here, and may be generally described as Mr. Broad's treatment, the basis of which consists of early shoeing and exercise. The shoe bearing that gentleman's name, being so well known, requires no description from me; that it would receive from the equine tribe a most eloquent testimonial of gratitude I have no doubt, were they only conscious of the cause of the great benefit it confers. Mr. Broad recommends exercise from the very commencement; indeed, he says the congestive or earliest stage is the one in which it is of most benefit, and he adds that it is necessary to be cautious in giving exercise during the stage of active inflammation. As far as I can gather, he does not poultice at all, and except in Laminitis from metastasis, he gives repeated doses of physic at intervals of about four days. My experience of Laminitis has led me to the conclusion that the cases require to be treated somewhat differently according to the cause.

In all cases I believe the best treatment at the commencement to consist in removal of the shoes, poulticing of the feet, and the use of an anodyne lotion to be well rubbed round the coronets. If the patient won't lie down and is in very acute pain I always cast, leaving the hobbles on for a while if there is any attempt to rise. Usually this is sufficient, and the animal settles down and goes to sleep. If of a nervous and excitable temperament, however, and disposed to struggle and attempt to rise, I give a full dose of morphia hypodermically, which usually so settles matters that the patient lies quite contentedly for several hours.

Bleeding from the coronary plexus I have tried often, but never could say it was of any benefit, perhaps for the reason that I never could obtain a sufficient flow of blood to be likely to be of any benefit.

In those cases which arise from concussion, over-exercise, or any cause connected with overwork I have found a moderate dose of physic to be superior to an oleaginous purgative, while in those cases due to over-feeding, want of exercise, or bad ventilation, in which the body is in an asthenic condition, and in that septic Laminitis which occasionally follows parturition in the mare I have found an oleaginous purgative, a full dose of linseed oil, to be the best. With regard to shoeing, I have found that Broad's shoes had better not be applied until the acute febrile stage is over, when they are of immense benefit in most cases. There are cases, particularly those of septic Laminitis following parturition, and in some of those in which there is a gross habit of body, a very fat animal, in which shoeing does harm, and had better not be resorted to; and if in any case the shoes seem to cause the animal more pain and to increase the lameness, I remove them at once. I have found a difficulty in getting a smith to make a good Broad's shoe even with a pattern before him, the tendency being to seat the shoe right from the outside instead of only from the nail-holes, and to make it so that it does not bear evenly on the ground, the inner rim being raised, and what is not perhaps of quite so much importance, to thin the shoe all the way from the toe to the heel, instead of only from the quarters. These little things may sound like details, but I hold they are matters of first importance, and even if they are details I believe the person who attends most carefully to matters of detail is the most successful practitioner. Immediately the physic or oil begins to act, febrifuges—pot. nit. in preference—

should be given in the drinking-water. If owing to the acuteness of the fever it is necessary in the early stages to give anything, I prefer aconite in small and repeated doses. As soon as the pain is sensibly allayed, and there is no sign of separation at the top of the foot, or if the case seems to hang fire for two or three days, neither improving nor going worse, a sharp blister round the coronets is imperative.

I have seen cases improve wonderfully in twenty-fours hours after blistering, that had apparently been at a standstill for two or three days. Of course I don't recommend blistering in all cases, many of them being recovered and ready for work in three or four days. These cases would seem to be rather simple congestion than true Laminitis, and will not be further mentioned in this paper. I should like the opinions of members here to-night as to the best method of treating those cases in which there occurs extensive separation at the coronet. My experience of them is not sufficiently large to warrant my going out of the beaten track of our text-books. With regard to exercise, I rarely exercise for the first couple of days; after that, in most cases, the Broad's shoes can be applied, and exercise becomes most useful. I do not, however, exercise to the extent advised by Mr. Broad, but only for about half an hour twice a day.

Now, I wish to say a few words with reference to the poultice to be applied. I invariably use the coldest poultice I can procure, because I think the arguments, both theoretical and practical, are easily in favour of the cold poultice. Just consider the question scientifically. The inflamed parts are enclosed in an unyielding horny box; the pressure of this box upon the contained swollen tissues increases the pain, and in all probability the amount of effusion from the congested vessels. In applying hot poultices it is evident that the relaxation of the hoof will not be in proportion to that of the soft tissues contained therein; the hot poultice will therefore increase the pressure, and thus increase the nervous irritation or pain arising from that pressure, and so increase the effusion; and remember, increasing the effusion means increasing the probability of dislocating the coffin bone. Therefore the only argument in favour of hot poultices—that it tends to allay the nervous irritation—cannot apply to those parts of the body in which an increase of the effusion or swelling is injurious. None of us, I suppose, ever heard of a hot poultice being applied to a man's head in brain fever; and surely if, as contended, the hot poultice applied to the feet relieves the nervous irritation, that treatment should be doubly applicable to the head, where there is so much more nervous tissue to go at.

Now a word as to pumiced sole. There are two kinds of dropped sole, the most common, unfortunately, being due to effusion and exudation at the anterior portion of the os pedis dislocating the toe of the bone downwards. The only treatment I have found of any avail in these cases is to shoe the horse with a box shoe and leather stuffed well with tar and tow, and have him turned out for a lengthened period on soft land. I have never seen the sole again become concave after the os pedis has dropped. I don't deny the possibility of it, but think it extremely improbable. The second kind of dropped sole is due to actual bursting, from congestion, of the blood-vessels of the sensitive sole, and is what I would call a false dropped sole, because, although it is really convex, as it exfoliates or is pared away at successive shoeings upon the animal's partial recovery, a space is discovered filled with blood-clots and bloody serum, beneath which is found a new sole quite in its proper position. I have seen this in two cases, in both of which the sole ultimately became concave, and the foot as good as ever.

The treatment to prevent dropped sole proposed by Professor Smith I must know more about before attempting, because it seems to me that to saw out a piece of horn from the front of the os pedis and expose the soft

structures would be likely, in the inflamed state of the foot, to lead to the formation of fungous growths which would be found most intractable to deal with. I have, by the kind invitation of Mr. T. H. Miller, of Singleton, had the opportunity of seeing a horse on which this method of treatment had been adopted, but not, it seemed to me, to the extent of sawing quite through the horn, but very nearly. The horse I refer to is the three-year-old royal winner shire stallion Munchausen. Mr. Miller himself is so satisfied that this is the best treatment that he has given instructions to his veterinary surgeon to treat every horse of his in this way, that is, I presume, every case of sufficient severity to cause the fear of a dropped sole. Personally I withhold my opinion for awhile, when I hope to have the opportunity of seeing the horse again. I am afraid, however, from what I have seen, that it will be found that the soles will be convex, which, it seems to me, is the especial aim of this treatment to avert. In the meantime our thanks are due to Professor Smith for daring to adopt this treatment, and I hope we shall await the result of a more extended trial of this method before being too critical, or, at any rate, prejudging its success or otherwise. The latest development in the evolution of Laminitis is the tentative statement by Mr. Stephenson that Laminitis may be hereditary. Of course I cannot pretend to measure my experience against that of Mr. Stephenson, but such as I have gained leads me to be very sceptical as to its heredity. I certainly was well acquainted with a hunter sire whose father had had Laminitis when four years old, and this hunter sire had Laminitis when rising three years old, not very severely certainly, but he has had attacks at intervals since, until now, though not more than eleven years old, he is a hobbling invalid with badly dropped soles. Of all the stock he produced during a four years' service in the district I do not recollect one to have suffered from Laminitis at all, although a certain percentage are now six or seven years old. This, it seems to me, goes to prove that Laminitis is not hereditary, and the circumstance of the entire hunter sire having Laminitis at three years of age and subsequently becoming a cripple from it, whilst his father had it at four years of age so severely that he never did any good after, seems to me to prove nothing more than that the method of forcing young entire horses, which, I suppose, is usual all over the country, is very liable to produce Laminitis. Personally, I could not allow for a moment that it should be classed as hereditary, for if it were I think we should have even more of it than we have amongst cart-horses. My impression is that few cart stallions that have to go the round of agricultural shows manage to pass through their life without an attack of more or less severity, generally due, I imagine, to over-kindness. However, this again is a subject upon which the opinion of this Association may well be taken, because although the statement was a most startling one to me, yet one must remember that the author of the statement is a gentleman whose opinion is deserving of the most careful consideration.

Gentlemen, I am aware that I have placed before you a very fragmentary and disconnected paper, but I hope it may serve its object of eliciting a good and useful discussion, and that whatever may be the omissions—almost unavoidable in a hurriedly prepared article—you will take the trouble to fill them up in the discussion; that whatever may be its shortcomings you will forgive them, and that concerning this disease, which I fear preventive medicine can never eradicate, you will feel with me that anything we can learn from mutual intercourse—and be the malady ever so common and familiar we can surely learn something—will add to the structure of veterinary science that is being built up, and which will in time command from the public that recognition it so justly deserves.

Mr. GREAVES said he was pleased with the manner in which Mr. Woods had dealt with the subject, and thanked him for the trouble he had taken in

preparing a subject for discussion at such short notice. In the course of his remarks he said that during his experience in Manchester he had had many cases. His treatment now was blistering early, applying broad shoes, and exercise.

Mr. J. H. CARTER gave some interesting particulars of a case he had under treatment.

Mr. HOPKINS and Mr. MOORE described "Smith's Operation" for Laminitis and Sidebone, which, in their practice, had proved very effectual.

Mr. DACRE thought they had heard nothing fresh respecting treatment. Regarding Smith's operation, he had met with success in cases of Sidebone. His practice was to cut the groove with a double-edged French drawing-knife instead of a saw. He would also try it in cases of Ringbone the first favourable opportunity that presented itself. He would also recommend it in some of the obscure diseases of the foot, where the horse would not lie down. In his treatment of Laminitis he casts when necessary, and insists upon the persistent application of ice to the feet from the beginning.

Mr. W. A. TAYLOR in his opening remarks also thanked Mr. Woods for his paper, prepared at such short notice. He agreed with Mr. Woods in the cause, symptoms, and effects of the disease. He met with the most difficult cases in over-fed shire stallions. His practice was cold application to the feet, with the internal administration of nitrate of potass and aconite. He believed there was no such thing as Metastatic Laminitis. He had practised Smith's operation with favourable results, but had not yet tried it in Laminitis. He recommended a good airy loose-box, with a bed of sawdust or peat-moss, or a mixture of both.

Mr. WOLSTENHOLME related several cases caused by indigestion, the latter being produced by feeding on bread.

Mr. LOCKE, in answer to Mr. Dacre, did not consider peat-moss to be injurious to the feet.

Several other members also joined in the discussion, after which Mr. WOODS replied.

It was proposed by the PRESIDENT, seconded by the SECRETARY, that a very hearty vote of thanks be accorded to Mr. Woods for his paper, which was carried unanimously.

ARTHUR LEATHER, *Hon. Sec.*

CENTRAL VETERINARY MEDICAL SOCIETY.

THE Nineteenth Annual General Meeting of the Central Veterinary Medical Society took place at the First Avenue Hotel, Holborn, on October 3rd, at 7 p.m.

Mr. ALFRED BROAD, the President of the Society, occupied the chair; the Fellows present were Messrs. Arthur and James Broad, H. Edgar, Gibbings, Gostling, Harrison, Hunting, Hurndall, Kendall, Mulvey, Oatway, Professor Pritchard, Messrs. Raymond, Reddish, Rogers, Roots, Samson, Slocock, Stanley, Wilson, Woodger, Wragg, and Villar; the visitors were Messrs. S. Broad, Eassie, Hill, Hibbard, and Professor Shave.

Letters expressive of regret at their inability to attend were received from Professor Walley and Mr. James Simpson.

Mr. T. HIBBARD, M.R.C.V.S., of Epping, and Professor SHAVE, of the Royal Veterinary College, London, were nominated for Fellowship of the Society.

The HON. SECRETARY read the Report for the past Session, which showed the Society to be in a prosperous condition; it now numbered 79 Fellows in its ranks, and the average attendance at the ten meetings held during the Session was 24.

The Election of Officers for the coming Session was then proceeded with by ballot, Messrs. J. Broad and W. Roots being appointed scrutineers.

On the motion of Mr. ALFRED BROAD, seconded by Mr. MULVEY, Mr. William Hunting was unanimously elected President.

Professors Axe and Pritchard, Messrs. Alfred Broad and Frank Wragg were elected Vice-Presidents, and the following gentlemen members of the Council:—Messrs. Raymond, Fred Smith, W. Roots, F. Oatway, H. Edgar, J. Mulvey, F. Samson, J. Broad, H. G. Rogers, S. Harrison, J. Rowe, and H. D. Gibbings; while Mr. Joseph Woodger was re-elected Hon. Treasurer, and Mr. Sidney Villar Hon. Secretary. As Auditors of Accounts Messrs. Roots and Gostling were unanimously elected.

Mr. F. SAMSON gave notice that at the next Council Meeting he should move "That the investment of a portion of the Society's money be considered."

Mr. FRANK WRAGG proposed, and Mr. SAMSON seconded, a vote of thanks to Mr. Broad for occupying the chair that evening. Mr. Broad suitably responded, and the meeting closed.

SIDNEY VILLAR.

SOUTH DURHAM AND NORTH YORKSHIRE VETERINARY ASSOCIATION.

ON September 18th, the members of the South Durham and North Yorkshire Veterinary Medical Association held their first general meeting at the North Eastern Hotel, Darlington, Mr. Nettleton, Northallerton, president, occupied the chair, and there were also present:—Professor Axe, London; Messrs. J. Fryer, Kirby Fleetham; W. T. Briggs, Stevens, and Toner, Darlington; Deans, Bishop Auckland; Snarry and J. T. Pickering, York; Alfred Peel, West Hartlepool; Lawrance and W. Awde, Stockton; Edmondson, Thirsk; and Dr. Hutchinson, Northallerton.

Apologies for non-attendance were received from T. Marr Harrison, Thirsk; and H. Gelsthorpe, Darlington.

The PRESIDENT, in reading his inaugural address, thanked the members for the great honour they had conferred upon him and expressed a hope that they would see their numbers strengthened, and that the nucleus already formed would in its turn develop into a parent cell. It had long been his wish to see something of the kind formed midway between Leeds and Newcastle, so that they might meet and discuss topics which tended not only to their mutual benefit, but to that of the public generally. All branches of industry had of late made rapid progress, and their profession had kept pace with the times. They were justly proud of their noble profession, for what could be more pleasing than to be able to relieve the sufferings of dumb animals? Things had changed very much for the better of late years, yet much still remained to be done before they obtained that useful position their training so thoroughly fitted them for. There was still a tendency to look upon them too much as curative agents, whereas if their opinions were more generally sought the curative treatment would in many cases not be essential. Their profession had existed as a corporate body since the year 1844, when a Royal Charter was obtained, giving them a professional status, but no great progress was made until within a recent period. It was highly necessary that they should work hand in hand with the medical profession, and endeavour to detect and prevent disease. The slaughter houses, cowsheds, and dairies should be under the immediate supervision of the veterinary surgeon, who, with the medical officer of health, should work with one object in view, that of the health and wealth of the community at large. He wished to make a few brief remarks on diseases affecting the lower animals which had rela-

tion to the human subject, and also to the means of conveyance from one to the other. Year by year the diseases of man and the lower animals were brought into closer relationship, and diseases which existed in one also existed in the other, and required the same treatment for their eradication. They could, however, use other methods than those practised by the medical profession; they could bring the pole axe into force, and though that seemed a very sweeping manner of treating disease, it was in many cases undoubtedly the best. They were free from Rinderpest and Foot-and-Mouth disease, but they still had the troublesome Pleuro-pneumonia to contend with, and there was yet another epizootic, which had wrought greater unseen mischief than any other. He referred to the already much discussed Tuberculosis. Looking at an individual tubercule, they might be led to despise its insignificance, and to ignore its deadly warning, but when they looked at the many thousand nodules existing in one single animal, they could not but recognise that they had an insiduous and deadly disease to fight with. Its progress in many cases was slow, but certain in its results, and in time it affected nearly every organ of the body, including the mammary gland, which secreted the milk used for daily consumption. There was, perhaps, no article of food more easily contaminated, both from internal and external causes, than milk. The mammary gland was particularly disposed to allow a free passage to various noxious and non-nutritive matters to pour into the milk reservoir, thus contaminating the fluid intended for the young. It had been held by many that cattle fed upon grains became diseased in a short time, and though that had not been his experience, he certainly did not advocate the too free use of grains. Cows so fed gave a large quantity of milk, but of an inferior quality, and if the feeding weakened the constitution it would be possible for Tuberculosis to supervene as a result. It was milk in quantity the dairyman wanted, but that was not the kind of milk suitable for delicate people or young children. Grains entered largely into the feeding of cows by dairymen, when they could be obtained, but they should be fresh from the breweries, because they spoiled by keeping. To obviate that, Herr Passburg had applied the principle of evaporation in vacuo to the extraction of moisture from solid substances, and had been successful in constructing an apparatus for drying grains, and two of the machines were being used satisfactorily at Messrs. Guiness', Dublin. An order was issued from the Privy Council for the registration with the local authority of all persons carrying on the trade of cow-keepers and dairymen, for the inspection of cattle in dairies, for securing the cleaning of milk stones, etc.; but was the order carried out, and, if so, by whom? It was, he believed, established beyond all doubt that Tuberculosis could be conveyed from animals to man. and it must be dreadful to think of the quantity of microbes consumed by man in the milk given by the dairy cows. The number of diseased cows in England at the present time was enormous, and yet so long as they could walk and the mammary glands secrete, the milk was used for human consumption. It had been fully demonstrated that calves born of healthy parents and suckled by a tuberculosed cow, had died when a few months old from acute Diarrhœa, and, on a *post-mortem* being made, had been found to contain innumerable caseous, and even calcareous and grey tubercule Tumours. Looking at that serious fact, was it not within the bounds of possibility that that might be one great cause of so many children dying also from Diarrhœa when a few weeks or months old? The virus capable of producing Tuberculosis when inoculated into the lower animals was discovered in 1843, and Kock in 1881 found the poison to consist of a rod-shaped microbe. He found the microbe was in length equal to the diameter of a red blood corpuscle. When stained with certain colours it presented a dotted appearance, showing that the protoplasm forming its body was interrupted. That condition was indicative of its power

of reproduction by spores, and the spores of microbes had greater vitality than the adult microbe. No one would deny that the disease was on the increase, and so long as it was allowed to run rampant they must expect it to be so; but if measures were enforced to stamp out all infected cattle, he had every hope that they would have less Phthisis in the human being. One striking feature which he had repeatedly noticed, was the rich appearance of the cream given by a tuberculosed cow. The owner would remark, "This cow gives the richest milk of any on the farm." But was not he (the President) right in saying the appearance was due to the milk being charged with pus cells liberated in abundance from the diseased lacteals, which must always exist in a chronic and advanced case of Tuberculosis? The etiology of Tuberculosis had been very much discussed. There was no doubt of its being hereditary, and animals with long attenuated figures, long and narrow chests, were those most liable to be attacked. Independently of hereditary influence, he had no hesitation in affirming that certain external circumstances, such as bad food, dark, badly-ventilated houses, excitement, fatigue, heat and cold alternately, etc., would either directly or indirectly tend to the development of the disease. The breeds of cattle most subject to the disease were Alderneys and Guernseys, and he had never met with a case amongst black cattle. To cause a gradual extinction of Tuberculosis, affected animals should come under the Contagious Diseases (Animals) Act, and compensation should be paid as in cases of Pleuro-pneumonia. No fine, however, should be inflicted on the owner for not reporting cases, because the disease might exist for a considerable time before it could be detected by an ordinary observer; but it would be his duty, on finding an animal losing condition, to call in a veterinary surgeon to determine the nature of the disease, and if the animal was found to be suffering from Tuberculosis, the case should be reported to the inspector and at once slaughtered. His opinion was that the carcases of animals affected by Tuberculosis should not be used as food. In cases where animals known to be diseased were bought by butchers for a few pounds and offered for human food, a severe penalty should be enforced. Against cases where a butcher had paid a fair market price for an animal, which was afterwards found to be diseased and ordered to be destroyed, provision should be made by bringing it under the Contagious Diseases (Animals) Act. The inspection of the slaughter houses should be in the hands of the veterinary surgeon, and from a sanitary point of view the advantage of public over private slaughter houses was very great. Private houses were most objectionable, and should not be tolerated by any town, being frequently situated in crowded unhealthy localities, and often kept in a filthy condition, and all kinds of diseased animals were therein dressed and sent into the market for sale. In fact, they were left without control. Slaughter houses should all be public, and situated on the outskirts of the town or near a station or landing-stage, and if private houses were tolerated they should be under strict supervision, and the inspector should give every attention to the animals slaughtered. He believed 9-10ths of the diseased meat offered for sale was slaughtered in those private houses. The inspector should undoubtedly be a veterinary surgeon, none other being so properly fitted for the post, and he should have a thorough knowledge of his duties and have an extensive and varied experience of the different subjects connected with the matter, and must note the characteristics of healthy and unhealthy meat, and the effects of various influences, physical, and otherwise, upon it. He should also have a thorough knowledge of comparative pathology, and should be able to work with free hands; he should not be allowed to practice privately. In fact, a department should be formed for the inspection of slaughter houses, cowsheds, etc., and carried out on the same system as the Excise. The community would then be better protected from

dangerous diseases, whether conveyed directly from animal to man or through the milk from dirty and carelessly kept dairies and dairy utensils. Even it they had any doubt about Tuberculosis being transmissible—which they had not—every means should be tried to stamp it out. He feared they could never hope to effectually free themselves from it, but they could minimise it very much. The relative frequency with which the disease appeared among fowls seemed to be not generally known, but from direct experiment and clenical observation it was proved not only that fowls contracted the disease by swallowing the expectorated bacilli, but that that thereby formed a vehicle for the further transmission of the disease to man and the lower animals.

I will not detain you longer, gentlemen. I had intended to treat this most important subject more fully had time permitted. I must apologize for the meagreness of this paper, which was hurredly put together during the spare moments of a busy life. In conclusion, my thanks are due to Dr. Fleming, and Professors Williams, Brown, and Walley, to whose writings I have referred.

Mr. PICKERING said he believed Tuberculosis was one of the most contagious diseases they had to contend with, and it was transmissible through milk; but with regard to the flesh, he thought that might be used for food if the mammary gland was not badly affected. There was a very great alteration needed in the way cowsheds were kept in York, some being in a very bad state. He thought the paper a very practical and valuable one.

A vote of thanks was accorded the President for his address, the discussion on which was postponed.

After the meeting, Professor Axe operated upon a horse affected with Roaring, and subsequently the members dined.

ROYAL SCOTTISH VETERINARY SOCIETY.

THE annual meeting of this Association was held on October 2nd, in the Royal (Dick's) Veterinary College, Edinburgh. Professor Baird occupied the chair.

Members present:—Professors Walley, McFadyean, Baird, Dr. Aitken, Messrs. Burnett, Campbell, Pender, Gilchrist, Whyte, Cowan, T. P. Young, Ferguson, Braes, Wallace, Porteous, and Fairbairn.

Professor McCall, Dr. Moir, and Mr. Malcolm were present as visitors.

The minutes of the previous meeting having been confirmed, the following gentlemen were elected members of the Society:—Mr. King, Ayr, and Mr. Baines, Golspie, proposed by Prof. Walley and seconded by Mr. Burnett. Mr. Young, Haddington, Mr. Pender, Lockerbie, and Mr. Braes, Linlithgow, were nominated for election.

Principal WALLEY then initiated a discussion on Pleuro-pneumonia.

Principal WALLEY said:—Of late we have witnessed a remarkable recrudescence in the newspaper agitation as to Pleuro-pneumonia, some of these organs, in fact, raising the subject to the dignity of a crisis; and while this agitation has largely arisen in consequence of the publication of reports by the various local authorities, of the bill of costs connected with the carrying out of the provisions of the Slaughter Order, I am afraid very much of it has had a selfish origin, and has been entered upon for such purely selfish purposes as a desire for fame, or, on the part of some, from a desire to pose as authorities on the question. But while such have been the motives of some of those who have engaged in the controversy, there are others whose sole object has been the harmless one of airing a particular hobby.

Again, there are others—"croaking pessimists" shall I call them?—who have endeavoured to show that some prophecy they may have given utterance to, to the effect "that wholesale slaughter would never eradicate the

disease," has been proved to have been correct by the fact that the measures now in force have failed to exterminate a malady which has been in our midst for upwards of half a century in the short space of eighteen months. Even the old cries of *spontaneous origin* and of "*the cure of Pleuro-pneumonia*" have been revived; and the further statement is made that the Slaughter Order has encouraged concealment, and has neither added anything to our knowledge of the nature of the affection or of the means of dealing with it—matters which some propose to elucidate by means of experimentation. There are some correspondents, too, who still blame the large cities, as London, Edinburgh, and Dublin, for spreading the disease.

The Slaughter Order.—Having briefly reviewed this correspondence, I propose in the next place to deal *in seriatim* with the various statements and assertions to which I have directed your attention, and firstly, in reference to the asserted failure of the Slaughter Order. Some time since, in referring to the suppression of Pleuro-pneumonia, I made a statement to the effect that "if I were given a free hand I would undertake to eradicate the disease from these islands within the space of two years," but in making this statement I had in contemplation a very different method of dealing with the disease than that now in vogue. So far as it goes, the Order is radical enough in its aims, but it fails grievously in several essential points, which those amongst you who heard my remarks on the subject in this place, at the time the Slaughter Order was promulgated, will remember I directed attention to in the short address I gave on sanitation.

Concealing Outbreaks.—The Order in its present form deals only with revealed or known centres of the disease, it says nothing as to the discovery of these centres, nor does it take any steps towards the attainment of this end; in fact, according to some, it favours the concealment of these centres, and in reference to this view of the case I would ask, are there any measures that could be devised that would effectually put an end to attempts at concealment? I have known the disease for the past thirty-two years, and, without egotism, I may say have had opportunities of becoming acquainted with it, which have been enjoyed by few practitioners now living in this country. I say I have known the disease for thirty-two years, and during the whole of that time—when there were no measures in force relating to it, when there was only restriction and compensation, and on through the period over which the Slaughter Order has extended—the feeling has existed amongst a certain class of stock owners that they were justified in concealing the existence of the disease for their own selfish purposes; and this feeling has not only existed in reference to Pleuro-pneumonia, it existed in connection with Cattle Plague, Foot-and-mouth Disease, and Sheep Scab, and it exists now in connection with Swine Fever, Glanders, and Anthrax; and will continue to exist so long as the world lasts and selfish people live in it.

Means of discovering Outbreaks.—Now, Mr. President, I would substitute for the term "concealed centres," the exact opposite term, "undiscovered centres," and repeat what I have said over and over again, that it is the duty of the Executive to find out these undiscovered centres: 1st, by abolishing all private slaughter-houses; 2nd, by establishing public abattoirs, and insisting that all dead meat shall be taken to a *receiving house* connected with these; 3rd, by appointing a staff of veterinary (not police) inspectors for the whole country, as was done in Cattle Plague time; 4th, by making the notification of disease compulsory, and by the making of *post-mortem* examinations of the carcases of all dead animals by State-paid veterinary surgeons compulsory; 5th, by substituting imperial for local compensation; 6th, by increasing the area of infected circles, so far as the public exposure of animals for sale therefrom is concerned, and lengthening the period of segregation. In this country segregation of infected places for

fifty-six days has always been considered sufficient, and the consequence has been that very frequently immediately on its expiry, or shortly afterwards, fresh cases of the disease have occurred. In continental countries, the isolation or maintenance of the cordon extends to months; and in Canada a quarantine is insisted on to ninety days; in the United States and Australia to many months; and in Denmark segregation extends over six months, or even more: 7th, by giving power to the veterinary inspector to seize and slaughter every sick animal in which the symptoms are such as to afford reasonable grounds for the suspicion that it is suffering from Pleuro-pneumonia; 8th, by scheduling Tuberculosis as a contagious disease; and, lastly, by placing the control of all measures introduced for the purpose of suppressing not only this, but other maladies of a similar nature, in the hands of one Central authority.

If such measures as these I have just sketched were enforced, it would be almost impossible for unscrupulous persons to hide the existence of the disease in their premises for weeks or months, while they, during that period, are bringing or sending the carcases of the affected animals to convenient depots, and consigning the live animals to public sales or markets, and in this way scattering the disease broadcast through the country.

Will Pleuro always be with us?—And what of the cry as to the perpetual existence of the disease amongst us? You and I, Mr. President, were not alive a century and a half ago—probably neither of us recollect distinctly the occurrences of half-a-century since, even—but it is nevertheless a matter of history, that for one hundred years prior to 1842, Pleuro-pneumonia was a stranger to this country; and looking back over the past quarter of a century I can see in my mind's eye counties and districts free that were at one time hot-beds of the scourge. Even in this very city there has been a period of two years of absolute freedom from the disease since I have been dealing with it in an official capacity.

In Holland, Switzerland, Norway, Sweden, Denmark, and in many of the North American States, it is no more known; and in face of these facts what right have we, I ask, to adopt the pessimistic view that Pleuro-pneumonia is always to be a scourge to our herds? *Periodical epizootic waves* of this, as of all other similar maladies, have swept over our country, but there cannot be any periodicity of such epizootic waves if we take the trouble to annihilate the essential element upon which they depend. There were some who prophesied that when Foot-and-mouth Disease was suppressed we should be visited by a periodical epizootic in due course. Well, we have waited for years for this recurrence, and it has not yet put in an appearance.

No Spontaneous Pleuro-pneumonia.—The doctrine of periodicity had a worthy congener in the *doctrine of spontaneity*. Life cannot be brought into existence by fortuitous influences, and if we believe, as we are bound to believe, and as all analogy teaches us, that Pleuro-pneumonia is due to a specific germ, then are we further bound to discard the notion that the disease can be induced by any concatenation of circumstances that man can bring about. Starvation, bad hygienic conditions, exposure, ill-usage, debility, and all other similar forces combined, will not produce one single case of Pleuro-pneumonia. All the cases we meet with must have been due to others, and as reasoning and intelligent beings it is our duty to find out where these other cases are hidden.

Pleuro-pneumonia Incurable. — The assertion that Pleuro-pneumonia can be cured is as little worthy of consideration as is the doctrine of spontaneity, but we cannot pass it by unnoticed. In the early days of my acquaintance with the malady I treated, and assisted in treating, as many cases of Pleuro-pneumonia as most men, and at one time thought a cure was frequently effected. The fact cannot be too strongly stated that *there*

is no cure for Pleuro-pneumonia; a lung or a part of a lung once affected can never again be restored to its original condition, but, on the contrary, it becomes for many months a slumbering volcano, waiting only for the influence of some disturbing agency to again rouse it into destructive action.

Disseminating Centres of the Disease.—Now as to the large cities being, as it is asserted by some, distributing or disseminating centres of the disease, I know nothing of London, but I have learned something of Dublin, and I think it may be allowed that I do know something of Edinburgh. In reference to Dublin, there can be little doubt but that one time it was a centre from which the disease was spread broadcast through the country, but at the present time I think I may confidently say that while it is still a slight or probable source of danger, every possible means are taken to prevent the infection of the thousands of animals which are annually shipped for this and other countries at the port of Dublin. From an intimate acquaintance with those engaged in the sanitary work of the port, and with the manner in which this work is carried out, I am in a position to assert that no animals passing through the city of Dublin for embarkation to other ports ever come within the range of even possible sources of infection.

In reference to Ireland generally, I have met with only one case of Pleuro-pneumonia in recently imported Irish cows during the last epizootic of the disease in this city.

Now in reference to Edinburgh, we have been frequently told that we are a *disseminating centre;* I do not deny that this may be so, but we are to a far greater degree *a receiving centre.* We receive animals from all the surrounding counties, from the northern counties of England, and from Ireland, and these are dispersed throughout numerous grazing districts and dairying centres. We adopt every means in our power to prevent the introduction of disease, and for detecting its presence when it is introduced; but an unscrupulous dealer comes amongst us and swamps our market with an infected stock from one of those undiscovered centres to which I have already alluded, taking care at the same time not to risk the sending amongst us of any animal palpably diseased, and the result is we become the victims of the cupidity of one man or of the supineness of another Local Authority, or, what is of more importance, the supineness of the governing body of the country.

Dairy Cows Spreading Disease.—Unfortunately, too, the animals which most usually introduce the affection are cows, the only class of cattle that find a home within our bounds; and one infected animal may be the means of carrying, indirectly, death and destruction into the midst of our dairies. And what remedy have we for this, or to whom are we to look for protection against it?

I have said that all that can possibly be done to guard against the introduction of disease is done, but if you consider for a moment the difficulties with which we have to contend in carrying out protective measures, you will see that there is little wonder we do sometimes become the medium through which disease is spread abroad in the surrounding districts.

Cows in an advanced stage of pregnancy, or that have just calved, are sent long railway journeys to the city, jostled and tumbled about in railway trucks, exposed to the effects of cold, hunger, and fatigue; they are put into our byres and washed from head to foot, then allowed to dry as best they may, and exposed the following day to the effects of inclement weather, and with this they are gorged with succulent food for the purpose of increasing the flow of milk, and in the vast majority of cases the lacteal secretion is allowed to accumulate to an inordinate degree, thereby inducing, with the other influences mentioned, a febrile condition, which frequently masks any evidence that may be present of the existence of disease of an important character.

So far as the spreading of disease by the dairy cows of the city is concerned, I am in a position to say that the danger in this direction is infinitesimal, as there is not one animal in 1,000 sent out of our byres for any other purpose than for slaughter, and the vast majority of these cows never come in contact with store animals after they leave the byres; they are sent direct to the fat stock marts, on fat stock sale days, and are drafted thence to the various fat stock centres for immediate slaughter. The only danger that arises within the city is the returning to the markets of animals which have been purchased on previous days of sale and found to be amiss after coming into the hands of the purchaser. Even this danger is guarded against as carefully as is possible.

Experimenting with Pleuro-pneumonia.—I have already remarked that a certain proportion of those who have written on this subject have advocated the adoption of experimentation on a *limited* scale, with the view of clearing up doubtful points as to the nature of the malady and its cause. Now, Mr. President and gentlemen, I would ask you—of what value can *limited experimentation* be in this country, seeing that *unlimited experimentation* has been carried on in various continental countries for many years past, and seeing that much study has been devoted to the subject by men of far greater experience and with far greater opportunities than are possessed by any past or prospective experimentalist in this country? I do not undervalue experimentation. On the contrary, I would give it every support in my power; but at the same time, I do not anticipate that substantial good can come out of it. In this country experimentation by veterinary surgeons, whether associated with biologists or not, has never been liberally encouraged, and even when attempts have been made by some of us to improve the method of inoculation, those attempts have been met with undeserved and ignorant censure, even from amongst the ranks of our own profession.

The Great Cause of its Persistence.—If the stamping-out process has not taught us much, it has at least gone far towards verifying the opinions we have held as to the nature of the disease and the causes of its persistence amongst us. It has emphasised my contention of many years' standing, that the great cause of the persistence of Pleuro-pneumonia in this country is the existence of infective centres of the disease in the lungs of animals which have been exposed to the contagion, but in whom there has been little or no evidence that they are the subjects of the malady. It is now some fifteen or sixteen years since I first promulgated the belief I had arrived at as the result of observation and experience, that animals which had suffered from the disease were

Living Centres of the Infection, and that they were a source of untold mischief. This belief or opinion was, on its publication, endorsed, in the first place, by Professor Ferrein of Berlin, and it has been accepted in this country by all veterinary surgeons whose opinions are worth notice or respect; and the result of the Slaughter Order has more than established the truth of my belief, for with few exceptions the outbreaks that have taken place in this city during the last eighteen months have been traceable to such centres of infection, and particularly has this been the case in those outbreaks which have owed their origin to cows from Cumberland. These infective centres have been a source of mischief, too, in the case of other districts, and especially in Fife, for, with one or two exceptions, such centres have been discovered in every lot of animals that has been brought to our abattoirs for slaughter as *healthy animals that had been in contact with diseased animals.*

Wrong Conclusions.—Moreover, these infective centres are often the means of giving rise to wrong conclusions as to the particular animal which has introduced the malady; and one example of this I will give you. A few

months ago an outbreak of Pleuro-pneumonia took place in an Edinburgh byre. The first case that was brought under my notice was in an Ayrshire cow that had been purchased about six or eight weeks previously at Dalkeith; but on inquiry it was discovered that the bulk of the cows in the stock had been brought from a byre in the district of a neighbouring local authority a short time before the date of the outbreak, and in slaughtering out the stock one animal that had been purchased seven months previously from one of the lots of contaminated Cumberland cows sold in the Edinburgh market was found to have a very old encysted Pleuro-pneumonia lung, or portion of lung, in a state of active degeneration, and two others were subsequently discovered with cysts of a more recent date. In the *pre-inoculation period* in this city we found that in all the instances in which the disease lingered in a byre, in spite of our efforts to suppress it, its continuance was coincident with the unconscious retention in the byres of cows in whose lungs old cysts existed, and that so soon as these were discovered and got rid of the disease disappeared also.

In the *inoculative period* my experience was an identical one, and if time permitted I could give you particulars of case after case in which, in spite of inoculation, the disease continued to develop until the animals with old centres in their lungs were discovered and slaughtered.

Inoculation Impotent.—The argument that inoculation renders these old pulmonary centres harmless is one that will not bear the slightest examination; it is based on ignorance of pathological processes, it is an attempt to deceive the unwary, and it is disproved by practical experience.

But if more evidence were needed of the impotence of inoculation as a reliable suppressive measure, it has been furnished during the past twelve months. Altogether some half-dozen cases have been brought to my notice in which animals inoculated by experienced operators have contracted the disease on its introduction to byres from external sources months after the period at which they were operated on and *rendered proof* or *protected* against the malady; but of these instances I will only direct your attention to two. In the first of these the disease was introduced by a Cumberland cow to premises in which stood, in two separate byres, (*a*) a lot of cows inoculated successfully six months previous; (*b*) another lot of recently purchased cows, which were only inoculated at the time of the outbreak. A short time after the slaughter of the Cumberland cow, *two cows of the* (*a*) *lot with docked tails developed the disease*; but, let it be noted, they had never been in absolute contact with the diseased cow.

In the second instance an outbreak of Pleuro-pneumonia occurred in two byres in a well-known dairy district in the city, and as a result thereof most of the cows in the adjacent byres were inoculated by an experienced operator, and three months afterwards a cow in one of these byres developed the disease with exceptional virulence, and on slaughtering out the herd we did not find another case, showing that the malady must have been contracted from the affected animals in the adjacent byres.

Value of Inoculation.—Inoculation is valuable as an accessory to other and more radical measures of prevention and suppression; it never has, nor ever will, eradicate the disease from any country, and those who trust to its doing so trust to a broken reed. If one attack of the natural disease will not in every instance protect against a recurrence of the malady, how can we expect that an induced and a milder attack will protect? Even the inoculating Continental countries have failed to get rid of Pleuro-pneumonia by inoculation, and its failure has been practically acknowledged by the recent vote of the Paris Congress, to the effect, "*that inoculation can only be recognised as an auxiliary measure to slaughter, and as a reasonable cause for delay in carrying out the latter,*" but in the next breath it was decided by the Congress

"*that inoculated animals must have no other destiny than the slaughter-house.*"

With these resolutions I cordially agree; the conclusions are those at which I have long arrived. I have stated over and over again that inoculation is only of use in the prevention of Pleuro-pneumonia, and that is as a *protective measure* in areas or circles in which Pleuro-pneumonia has made its appearance, and in stocks in those areas in which it is believed that the animals are not actually affected with the disease. Even a well-known and an experienced inoculator in the neighbourhood of this city emitted a declaration some time ago to the effect, "that every inoculated animal, when fit (fat), might go straight, and by float, to the slaughter-house."

The Slaughter Method.—The method of slaughter for the suppression of Pleuro-pneumonia has been dubbed a brutal and unscientific one. I would ask, In what way does the element of brutality come in, seeing that every animal of the bovine species that is brought into this world is destined for slaughter unless death from some other cause results? And as for the charge of its being unscientific, I am quite willing to admit the charge within a certain limit; but it has been proved on many occasions that it is the only method capable of bringing about the actual suppression of contagious maladies; and I am bold enough to assert that no malady of this class has ever been got rid of without its assistance.

It is obvious that such a method could never be made applicable to the suppression of contagious maladies in the human subject, although a statement has been recently going the round of the press to the effect that a Russian minister, being charged with the suppression of an outbreak of plague in a village, deliberately placed a military cordon round the doomed area, and, after saturating the buildings with petroleum (or paraffin) consigned the village and its plague-stricken inhabitants to the flames, with the result that the plague was effectually suppressed.

The Stamping-out Process.—In reference to this matter I would ask, by what means have the different contagious maladies that have at various times raged in this country been got rid of except by the "stamping-out" process? In 1862 Sheep-pox was introduced amongst certain flocks in the neighbourhood of London; at that time, as now, there were two schools of suppressionists—one advocating inoculation, the other slaughter. After a trial of the former, and its failure, the advocates of slaughter, amongst whom (and probably the most important) was Professor Simonds, had their innings and won. In 1865-6 Cattle Plague ravaged our herds, and for months the scientific section of the suppressionists held the field with vaccination, introduced, be it remembered, by members of the medical profession, and once more, after they had had their innings, the *brutal method of suppression by slaughter proved the winner*, as it has in every outbreak that has occurred in this country since. What *but practical* measures were employed for the suppression of Foot-and-mouth Disease? Have any other than practical measures been adopted for the suppression of Swine Fever, Glanders, and Rabies in this city and in other places? What has science effected in the eradication of Scarlet Fever, Measles, Typhoid Fever, Syphilis, Leprosy, and a host of other similar maladies? Why even in scientific Paris a resolution was passed at the Congress the other day, demanding the application of the most rigid, practical measures for the suppression of La Maladie du Coit.

If we want to lift the cloud that has so long hung over us, if we would regain our credit with the great stock-importing communities of the world, and remove those harassing restrictions which are in force against us in the Scandinavian States, in many parts of the United States of America, in Australia, and even in our own Colonies, we must put our shoulder to the wheel and spare no effort, be it never so radical in its tendency, to rid these

islands from a scourge which has for long been a hindrance to the prosperity of the stock-raising portion of the community, and a disgrace to our sanitary system and to our sanitary knowledge.

(*To be continued.*)

Army Veterinary Department.

Gazette, September 27th.

YEOMANRY CAVALRY, MONTGOMERYSHIRE.—John Christopher Rowlands, gent., to be Acting Veterinary Surgeon.

Obituary.

We regret to announce the death of Mr. W. Cawthorn, M.R.C.V.S., of Hadlow, Kent. He was one of the early members, and we believe the treasurer, of the Southern Counties Veterinary Society. He graduated in 1851.

The following deaths have been reported:—

Mr. C. Waterman, M.R.C.V.S., Reading, Berks, who graduated in 1851; and Mr. J. Carruthers, M.R.C.V.S., Wigton, Cumberland, a graduate of 1887.

Notes and News.

THE BEST DISINFECTANT.—Recent investigations have shown that gaseous substances, such as sulphurous acid gas and chlorine gas, which have been often used for the purpose of disinfecting buildings, cannot be relied on, and that the only disinfectant that can be depended upon to kill micro-organisms, particularly those capable of producing the infectious diseases, is a free application of a solution of perchloride of mercury. It is well to have this solution slightly acid, coloured also in such a way that it shall not readily be confused with drinks or medicines; and proper precautions should be taken to prevent accidents in its use. The solution is made by dissolving half an ounce of corrosive sublimate and one fluid-ounce of hydrochloric acid, in three gallons of common water, with five grains of commercial writing blue, or ordinary violet ink, to give the fluid a conspicuously distinguishing character. The solution is easily made, keeps well, is very inexpensive; it should not be further diluted, and is easily applied. The use of non-metallic vessels (wooden or earthenware house-tubs or buckets) should be enjoined on those who use it. It should be applied with a whitewasher's brush, and a syringe should be used to squirt it into any nooks or interstices which the brush cannot reach. Wherever used, the solution should be liberally applied, and should be allowed to remain over night on parts which animals are likely to touch (mangers and racks, for instance,) and which should be afterwards washed with warm water in order to remove the mercury.

DISTEMPER IN DOGS.—A correspondent of the *Sportsman* writes that he has been rearing dogs for over thirty years, and has never had a single case of distemper. The preventive treatment is by inoculation when six weeks old. It is further averred that a dog that has never suffered from distemper is never liable to rabies in any form in after life.

COW-POX IN ITALY.—The Animal Vaccination Committee of Milan has recently had a windfall, in the form of a supply of lymph derived from a herd of cattle in which Cow-pox had spontaneously broken out. On August 3rd the Prefect of Sondrio (N. Italy) announced that natural Cow-pox had appeared in a herd in the commune of Cosio, in Valtellina, at a height of 2,000 mètres, near the top of the Tagliata Alp. The eruption had shown itself on the udders on June 27th, and of the eighty cows only four had not been attacked. The herd was examined on August 8th by a veterinary surgeon, who found marks of the disease in a great many of the animals. One of them was found to have pustules still full of lymph, from which some glass tubes were filled and despatched to Milan. On August 13th the Milanese Committee inoculated a healthy cow with this lymph in more than fifty places. On the 19th it was found that all these points had taken; and on the 20th, after careful examination of the bovine vaccinifer, which was found to be perfectly healthy, the lymph was successfully used on the human subject. This is the twentieth time in twenty years, and the third in the present year, that the Milanese Committee has been enabled to renew its lymph supply in the same manner, the last occasion having been in March of the present year.

THE SALE OF HORSEFLESH LAW.—By the just-passed Act (52 and 53 Vic., c. 11) to regulate the sale of horseflesh, it is provided that in future no one is to sell, offer, expose, or keep for sale any horseflesh for human food, elsewhere than in a shop, stall, or place over or upon which there shall be at all times painted, posted, or placed in legible characters of not less than four inches in length, and in a conspicuous position, and so as to be visible throughout the whole time, whether by night or day, during which such horseflesh is being offered or exposed for sale, words indicating that horseflesh is sold there. And no one is to supply horseflesh for human food to any purchaser who has asked to be supplied with some meat other than horseflesh, or with some compound article of food which is not ordinarily made of horseflesh. To ensure these beneficent objects, power is given to medical officers of health and inspectors of nuisances to inspect any meat which they have reason to believe to be horseflesh which is exposed for sale, and to seize it if necessary; and power is given to magistrates to grant warrants for search and to make orders with reference to the disposal of horseflesh. The penalty for offending against the said Act is a maximum of £20, and if any horseflesh is proved to have been exposed for sale to the public in any shop, stall, or eating-house which is without a "horseflesh placard," without anything to show that it was not intended for sale for human food, the onus of proving that it was not so intended shall rest upon the person exposing it for sale. Lastly, for the purposes of the Act, the term "horseflesh" is to include the flesh of asses and mules, and shall mean horseflesh, cooked or uncooked, alone or accompanied by or mixed with any other substance. This new law came into force on Michaelmas Day.

THE LONDON DOGS' HOME.—The Secretary of the Dogs' Home has given a return for the month of September, from which it appears that no fewer than 2,619 dogs were received, fed, and sheltered at the Home during that month, and that nearly 400 homes were found for the more fortunate ones. The growing popularity of the "Home" is seen by the large number of visitors (3,158) who inspected the establishment during the month.

DOES SALTING MEAT DESTROY BACTERIA?—Professor J. Forster, of Amsterdam, has published an account of some investigations made in his laboratory by himself and Heer de Freytag, having for their object the determination of the effect of the common process of salting or pickling meat on various forms of bacteria. It was found (says the *British Medical*

Journal) that cholera bacilli were soon destroyed under the influence of abundance of salt, usually in a few hours; but that typhoid bacilli, pyogenic staphylococci, the streptococci of Erysipelas, and the bacilli of porcine infectious diseases frequently retained their vitality for several weeks, or even months, in spite of the presence of abundance of salt. The same was also true of the bacilli of tubercle. In some cases these bacilli were found alive after being two months in pickle, their vitality being proved by their capacity for infecting new cultures. Portions of the viscera of a tuberculous animal, preserved for a considerable time in salt, were found capable of causing Tuberculosis in a healthy animal when introduced into its peritoneal cavity. Experiments on the spleen of an animal which had died of malignant Anthrax showed that salt possessed the power of destroying the bacilli of this disease in about eighteen hours. These, as well as cholera bacilli, were found to require $7\frac{1}{2}$ per cent. of salt to destroy them. From these facts it would appear that salting or pickling has but little destructive effect on many of the more common forms of bacilli liable to be found in diseased meat.

Contagious Pleuro-pneumonia Inoculation.—The experiments of inoculation against bovine contagious Pleuro-pneumonia, under the management of Professor Dr. Schuetz and Dr. Steffen, at Magdeburg, have given full satisfaction, and the favourable results were published recently. The trial animals were inoculated with fresh warm lymph, and were under observation for eight months. The opinion in Germany is that carefully inoculated animals are protected from Pleuro-pneumonia.

Swine Plague in Denmark.—An epizoöty of Swine Plague has broken out among the swine at Roeskilde, near Copenhagen.

Correspondence.

VAGINAL CYSTS.

Dear Sir,—No one has enjoyed more pleasure than I have in reading, in the September number of the Journal, the first part of "Diseases of the Urinary and Generative System." It is excellent. On page 194, the writer, A. E. Macgillivray, M.R.C.V.S., speaking of cysts in the vagina, says he cannot account for them. Now I reason that they cannot be anything but "retention cysts"—simply the distention of the canals of Gartner. At the time of gestation these canals are very evident. Perhaps consulting Bland Sutton would give the writer above mentioned some light.

Hillsborough, Ohio, U.S.A., *Oct. 5th.* S. R. Howard, V.S.

VETERINARY CANDIDATES.

Dear Sir,—"The cowl does not make the monk," neither does the diploma of the R.C.V.S. make the veterinary surgeon.

A man must be *born* a horseman; he cannot be made one. A lad who notices the different horses as they pass him, and offers some remark about them, and would walk six or seven miles to see the hounds thrown off, or run a mile to get across the pig skin; this is the sort of boy of which to make a veterinary surgeon. That man who enters our profession with the *sole idea of making* the "almighty dollar" makes such a mistake!

Have the many groaners and strugglers ever seriously asked themselves if they are giving the time and labour of their lives to the profession for *which Nature has best fitted them?* If parents took more trouble to ascertain the

natural bent of their children's inclinations, and allowed them to follow them, aided, of course, by their advice, there would, methinks, be fewer failures in the "battle of life." SNAFFLE BRIDLE.

VETERINARY CREMATORIES.

SIR,—Is it not reasonable to believe that much disease is disseminated by allowing the carcases of animals, dead from contagious diseases, to be carelessly disposed of? Why should not each city in England be provided with a veterinary cremation apparatus? ASHES.

IS THE PROFESSION BECOMING OVERSTOCKED?

SIR,—I was present at the opening meeting of the Royal Veterinary College on October 1st, and in addition to hearing the introductory lecture by Dr. Yeo, heard the subsequent remarks made by Professor Brown, as to the large number of cattle and other animals there are in this country, and the consequent abundance of occupation there was for a much greater number of veterinary surgeons than the United Kingdom contains at present.

I was, and I am sure others were, much startled at the statement; for the experience of the past ten or twenty years goes to show that, both in country and town practice, the vocation of the veterinary surgeon is not what it used to be, and that the majority of practitioners find it difficult to make a decent living, let alone save anything for old age or adversity. Farmers and others do not call for the services of veterinary surgeons so frequently as formerly, and many of them have their medicine-chests and doctor their own animals. The fees for veterinary attendance have also considerably diminished, while the competition is becoming extreme, there being three or four times the number in practice in many places than there were twenty or thirty years ago, and the cry is, "Still they come;" for the four veterinary schools are crowded with young men, who will be launched out among us with all expedition, several entering into the competition in a place where there is scarcely a living for one, and where there may be already five or six. Such is the case in my part of England, and I can scarcely doubt it is the same in others.

The consequences we all know; in only too many instances the fierce competition leads to strife and to unprofessional conduct—the practitioners ready to fly at each others' throats, and to canvass and underbid for each others' work in the most shameless and degrading manner.

Yes, sir, I think there can be no doubt about it that the profession is already greatly over-stocked; and as every examination of the Royal College rapidly exaggerates the evil, it is not difficult to prognosticate what the result will soon be. That the best days of the profession in this country are over has long been apparent, and that there is a decadence in position and degradation in the manners of many practitioners everywhere, through the abnormal competition, is, alas! still more evident. We have always had social and professional failures in our ranks—men who could perhaps write and talk glibly enough, but who, either from laziness or lack of knowledge, or both, could not earn salt for their porridge. Such men will be greatly multiplied as things are now going on, and they will doubtless expedite the downward course of veterinary surgery, as they must live, and yet they cannot earn a livelihood by their calling; even starting a weekly *Veterinary Reviler* will not keep them afloat, nor yet will circular-disseminating and newspaper-advertising do them much good after a time.

I come back to the question, Is our profession in this country not already overstocked? and is there not a change for the worse, leading to rapid deterioration in its condition? COUNTRY PRACTITIONER.

October 17th.

HOW TO BECOME A VETERINARY SURGEON.

DEAR SIR,—While waiting, a day or two ago, in a druggist's shop for some article, I casually picked up the periodical entitled *Chemist and Druggist.* For the edification of its readers, it set forth certain instructions as to "How to become a Medical Practitioner." And then came instructions in reference to "How to become a Veterinary Surgeon."

I was much amused at the remark, "There is no condition of previous training necessary, ... such as apprenticeship."

Of course the writer of the matter in the Journal was only quoting the necessary forms to go through to become a M.R.C.V.S.

Not much *previous training* is necessary to convert a chemist's assistant—and to him the writer particularly referred—into a M.R.C.V.S., able to visit and dispense for a lady's lap-dog; but most people will admit that it is not only necessary to have a life-long training with cattle to become a *properly* qualified veterinary surgeon, but they will go further, and state that there must be the right material to shape or begin upon. In other words, a horseman is not *made* but *born*, and all veterinary surgeons, except those who stick to theory and canine practice, should be *by nature horsemen.*

RECADO.

TO CORRESPONDENTS.

OLD SUBSCRIBER.—We must decline to publish your letter, though we recognise the chivalrous spirit which animates it. We would advise you to pay no heed to the statements made in the journal alluded to, as they are unworthy of notice and untruthful, and their object is obvious to the meanest understanding.

ASPIRANT.—Apply to the Principal Veterinary Surgeon to the Army. The list of candidates is very full, and vacancies are few and far between.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from W. Awde, Stockton-on-Tees; R. W. Burke, A.V.D., Athlone; S. M. Smith, A.V.D., Kirkee, Bombay; J. McKenny, Dublin; J. Mills, A.V.D., Sheffield; C. Cunningham, Slateford; F. Raymond, A.V.D., Woolwich; M. Cawthron, Hadlow; "Recado;" F. Smith, A.V.D., Aldershot; A. E. Macgillivray, Banff; S. Villar, Harrow; W. S. Johnson, Glasgow; A. Leather, Liverpool; "Aspirant;" "Old Subscriber;" S. R. Howard; Hillsborough, U.S.A.; "Ashes;" "Snaffle Bridle."

BOOKS AND PAMPHLETS: *Finlay Dun*, Veterinary Medicines; Hydrophobia, its Cause and Cure; *Dr. J. G. McKendrick*, A Text-book of Physiology; *Robertson and Penberthy*, A Text-book of the Practice of Equine Medicine; *Drs. Boschetti and Bassi*, Fleming's Trattato di Ostetricia Veterinaria; Report of the Bombay Veterinary School for 1888; Annual Announcement of the Ontario Veterinary College; Bulletin des Séances de la Société Nationale d'Agriculture de France; Eleventh Annual Report of the State Board of Health of the State of Rhode Island.

JOURNALS, ETC.: *Revue Internationale des Falsifications; Œsterreichische Zeitschrift fur Wissenschaftliche Veterinärkunde; Hufschmied; Clinica Veterinaria; Annales de Méd. Vétérinaire; Lancet; Recueil de Med. Vétérinaire; Live Stock Journal; Echo Vétérinaire; Edinburgh Medical Journal; Revue Veterinaire; Wochenschrift für Thierheilkunde und Viehzucht; Deutsche Zeitschrift fur Thiermedicin; Thierarzt; American Veterinary Review; Russian Veterinary Journal; British Medical Journal; American Live Stock Journal; London Medical Record; Mark Lane Express; Archiv fur Wissenschaftliche und Praktische Thierheilkunde.*

NEWSPAPERS: *North Star; Scotsman; South-eastern Gazette; Hendon and Finchley Times.*

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TUBERCULOSIS CONSIDERED FROM A SANITARY POLICE AND ALIMENTARY POINT OF VIEW.*

BY PROFESSOR ARLOING, DIRECTOR OF THE LYONS VETERINARY SCHOOL.

(After alluding to the Organising Committee of the International Veterinary Committee having desired Dr. Lydtin of Carlsruhe, Professor Perroncito of Turin, and Professor Arloing of Lyons, to prepare a report on Tuberculosis, and of the former having been unable to comply, the author admits that during the five years which have elapsed since the last Congress held at Brussels, much light has been thrown upon the disease by the experimental researches which have been made, and thinks that in a reunion of veterinary surgeons from every part of the world, the special questions as to the sanitary measures and the alimentary hygiene relating to it, should receive careful deliberation.)

1. *Tuberculosis considered from a Sanitary Police Point of View.* We might continue to discuss for some time the heredity of Tuberculosis, and might demand whether the progeny of tuberculous parents are born *tuberculised*, or, rather, more *tuberculisable* than other offspring; but it is no longer possible to entertain any doubts as to the dangers with which tuberculous cattle threaten their neighbours and their descendants. Such animals expel the virus by the respiratory and digestive passages, and by the mammary secretion. The virus may infect healthy creatures when introduced into their digestive apparatus with the food or drink, or

* A paper prepared for discussion at the late International Veterinary Congress held at Paris.

through the respiratory organs with the air. Oft-repeated experiments made by men in whom confidence can be placed, have put these facts beyond all dispute. Therefore it is logical to adopt measures to oppose the propagation of Tuberculosis by the tuberculosed; and the first measure is to include this malady among those which in every country are combated by sanitary police regulations. This measure figures as No. 3 among the resolutions presented at the Brussels International Congress by Herr Lydtin. Pressed for time, however, the measure could not be discussed, the members being more preoccupied with the alimentary hygiene of man than contagion from animal to animal; and by a deviation somewhat frequent with minds hurried and absorbed by a particular point of view, they did not perceive that the measures concerning the alimentary hygiene should be the corollary, and not the premises of those with regard to contagion.

The question, therefore, remains to be studied, and it more or less occupies our confrères in every country. It was specially examined in 1885, by the second National Congress of French Veterinary Surgeons, meeting as a Sanitary Congress; and after a long discussion it was decided, by twenty-eight votes against seventeen, that the Government should *include Tuberculosis among the diseases inscribed in the law of July 21st, 1881, on the sanitary police of contagious maladies.*

The French Government, taking this decision into consideration, on November 12th, 1887, added bovine Tuberculosis to the list of contagious disorders, in the decree which rendered the sanitary police law of July 21st, 1881, effective in Algeria. Lastly, in another decree of July 28th, 1888, this malady was inserted amongst those amenable to the sanitary law in French territory. Consequently, at the present time bovine Tuberculosis is the object of repressive measures in France and Algeria. The general terms of the law, which compels the owners of animals affected with a contagious disease, or veterinary surgeons authorised to attend them, to declare its existence, and forbids these animals being sold or moved without previous authority, are also applicable to Tuberculosis as to all other maladies officially recognised as contagious.

The administration has, besides, given in detail the measures which it is desirable to employ against the disease. It is well that the Congress should know that these measures are not absolutely identical in France and Algeria.

In Algeria, in a case of Tuberculosis, the Mayor or Administrator of the Commune issues an order for the destruction of the animal, and the flesh must not be used for food. In France, every animal recognised as tuberculous is isolated and seques-

trated, and can only be moved for slaughter, which takes place under the supervision of the sanitary veterinarian. With regard to the flesh of tuberculous cattle, its consumption is sometimes permitted under certain conditions to be alluded to hereafter.

The Congress will doubtless observe that these measures, although different, will have the same result. An owner cannot keep a tuberculous animal isolated and sequestrated for an indefinite period, and as he can only move it for slaughter, he promptly demands this measure.

In Algeria slaughter is compulsory, while in France the administration indirectly causes the owner to apply for it. The *modus facienda* employed in Algeria may, *à la rigueur*, legitimise a demand for compensation; while the *modus* adopted in France may lead the administration to believe that the owner has no claim against it. And, rigorously, this thesis may be maintained; for a tuberculous animal is a source of danger to the property of other owners, and it is not permissible to anyone to do damage. If the damaging animal is not voluntarily disposed of by its owner, then society should require its destruction.

But a more conciliatory thesis has been at times upheld, and even by Lydtin at Brussels; most frequently, he insisted, the disease is introduced into a cowshed unknown to the proprietor, who is therefore the victim of a pre-existent contagious disorder; so that in compelling him to make a sacrifice for the public good, society should recoup him a portion of his loss. Besides, in order that the law should be efficacious, the owners of tuberculous cattle should not have to militate against their own interests in submitting to the obligation of declaration, and the only way to diminish their resistance is to establish the principle of compensation in cases of slaughter.

Nevertheless, it appears going too far to render the State alone responsible for a condition of affairs which is often brought about by the carelessness of owners; it is, therefore, to the principle of mutuality that recourse must be had, and this principle can be applied by the State. And it would be equally excessive to allow vicious speculation to falsify the principle of compensation.

But I anticipate the privileges of the reporters on the third question, whose mission it was to find the means of practically assuring the payment of an indemnity in the case of compulsory slaughter to prevent the extension of a contagious disease; though it is my duty to indicate, as well as I can, the probable burdens which the compensation fund would have to bear with regard to Tuberculosis, in order to throw light on our decisions.

Lydtin made strenuous efforts to fix the attention of the Brussels Congress on the frequency of bovine Tuberculosis,

and his investigations are very interesting, especially those with regard to the Grand Duchy of Baden, and the figures he obtains from Göring as to Bavaria, as they refer to all the animals in these countries.

Phthisis more particularly affects cattle aged from three to six years, and should be more frequently observed in the abattoirs than in the country cowsheds. In Bavaria, the proportion of tuberculous animals noted at the Munich abattoir is as high as 12·5 per 1,000; it is no more than 1·6 throughout the country. In the Grand Duchy of Baden, the proportion is 8 per 1,000 among the animals killed for food, and 2·2 per 1,000 among the cattle generally of the whole Duchy. Lydtin did not omit reckoning those cases which are unobserved, and those also which are dissimulated; and on the whole he concludes that 4·5 per 1,000 of the entire bovine population is affected with Tuberculosis in the Grand Duchy.

The statistics collected in Bavaria and Baden have also demonstrated that the disease was very inequally distributed in regions, and even in districts.

It is known that for some time inquiries of the same kind have been made in different parts of Europe, and it is therefore probable that the International Congress will see collected valuable information. Indeed, in France the elements of a statistic are already derived from the registers of the abattoirs inspected by veterinary surgeons, and the following are to hand.

In the abattoirs of Bordeaux, according to M. Baillet, the proportion of cattle tuberculous in every degree, is 2 per 1,000.

At those of Rouen, according to M. Veyssière, the proportion was, from July, 1884, to the same month, 1888, 1·43 per 1,000; 15 cases a year in 10·500 animals. During 1888, there were 23 cases among 12·174 bullocks, cows, and bulls.

At Montauban, according to M. Bayron, in a period of six and a half years, among 15·483 cattle slaughtered, there were noted 63 (4·07 per 1,000) which were affected with generalised Tuberculosis; those affected with the localised disease were not reckoned.

At Lyons, among 50,000 oxen, there were about 50 tuberculous: 1 per 1,000.

In Paris in 1882, of 260,000 adult bovines, only 11 were rejected, 684 being accepted which were only affected with local Tuberculosis. Including all the cases, the proportion is 2·60 per 1,000. The statistics collected in the abattoirs of La Villette and Grenelle by M. Villain, have given a proportion of 6 per 1,000 of 500,000 bovines slaughtered every year in the abattoirs of Paris, or 3,000 animals affected in various degrees. Paris receives more than forty million kilogrammes of flesh annually, derived from

about 100,000 animals; for this last series the proportion is certainly 10 per 1,000.

In the Lille abattoir, the proportion of tuberculous adults has been 1·05 per 1,000 in 1882 and 1883 (Vittu).

In the Melun abattoir, during the four years from 1884 to 1888, the number of the tuberculous has been 4·31 per 1,000 of 5,766 animals (Barrier).

At Cambrai, during eight years, M. Cartier has observed five cases of Tuberculosis among 1,000 cattle slaughtered.

In a note from M. Morot of Troyes, in the statistics collected between October 1st, 1884, to February 28th, 1889 (four years and five months), it is shown that Tuberculosis has been remarked in 4 bullocks, 8 bulls, and 299 cows (in all 311 bovines), of 2,000 bullocks and bulls and 21,000 cows (23,000 animals slaughtered); which gives a proportion of 14·5 per 1,000. Specific tubercles were observed in a calf of eight months, 44,000 calves having been slaughtered.

At St. Etienne, M. Labully examined 12,978 carcases of cattle in 1888, of which he ordered the total seizure of 25, and the partial seizure of 35 others, because of their being tuberculous; or a proportion of 5 per 1,000.

From these figures, it results that we may estimate at 5 per 1,000 the proportion of tuberculous amongst the adult bovines in France. It might, doubtless, be objected that the information is derived from inspected abattoirs, and that it is a matter of public notoriety that animals suspected of being tuberculosed are not sent to these establishments. This is true; but if the proportion of the tuberculosed is greater among the animals slaughtered elsewhere, it is much lower among the general bovine population. We have already seen the results of observations made in the Duchy of Baden. Thus it appears reasonable to accept the average proportion of 5 per 1,000.

Let us calculate the number of affected animals in the whole of France, in taking for granted that the malady is somewhat uniformly spread throughout the land.

According to the Agricultural Statistics of the Minister of Agriculture, there were on the French farms on December 31st, 1887, 8,623,441 adult bovines. This number may be raised to 9,000,000 for the whole of France, if we include those kept elsewhere than on farms; and if we admit a proportion of 5 per 1,000 of tuberculous adults, we shall see that the number affected with the disease is 45,000. The average value of each of these animals being 300 francs (£12), the amount of compensation to be awarded in case of compulsory slaughter would be 9,000,000 or 6,750,000 francs, according as this is fixed at two-thirds or

one-half the value, if we could at once discover and kill all the diseased. But it must not be lost sight of that this sum would necessarily be divided, owing to the indefinite number of slaughterings, and that in each year there would be a gradual reduction.

We may add some information with regard to other countries of Europe.

In England, M. Cope states (Congress for the Study of Tuberculosis) that the proportion of tuberculous animals is from 1 to 26 per cent., according to the locality.

In Belgium, according to M. Van Hertsen (*Ibid*), the proportion is 4 per cent.

In Holland, M. Thomassen reports (*Ibid*) the proportion to vary between 8, 4, and 19·6 per 1,000.

At the Augsburg abattoir, the proportion was, in 1887, 3·62 per cent. among adult cattle and 0·013 per cent. among calves.

It has been mentioned above, that at the Congress of French Veterinarians in 1885, a minority did not vote for the immediate inclusion of Tuberculosis in the sanitary police law on contagious diseases. Impartiality renders it a duty (otherwise easily complied with) to give the reasons which swayed our honourable colleagues. Their timidity proceeded from the difficulty in diagnosing bovine Tuberculosis.

In the report of the Brussels International Congress will be found a review of the diagnostic signs of Tuberculosis by M. Lydtin. The reporter remarks, in concluding, that veterinary surgeons too often wrongly exaggerate the difficulty in diagnosing this affection. The attentive breeder is able to select tuberculous animals in his herd; and it might be expected that the veterinary surgeon, who is armed with more extensive theoretical knowledge and more numerous means for investigating disease, should be as competent to act as the farmer. It is true that the latter has the animals under his eyes for a long time and proceeds slowly, while the veterinary surgeon is required to make his diagnosis with certainty in a short time.

Nevertheless, we think with Lydtin that this should not be a cause of discouragement, but rather a reason for examining the question on every side, and for perfecting our means of diagnosis. So it has been understood by several of our confrères, a *rèsume* of whose labours in this direction we may give.

The lesions of Tuberculosis may be evolved in every one of the organic systems, but we need scarcely occupy ourselves with these beyond thoracic and abdominal Tuberculosis, in connection with which comes Tuberculosis of the lymphatic glands, superficial or deep, Tuberculosis of the mammæ, bones, etc.

To establish the diagnosis of the pectoral form, some persons

believe that the ordinary clinical signs may suffice, if not to recognise the advent of Phthisis in any sick animal, at least to discover cases of Tuberculosis in a shed where it is known the disease has shown itself. M. Grissonnanche thinks that, except contagious Pleuro-pneumonia, the non-tubercular diseases of the pleura and lungs are rare in the ox; so that if in a bovine there are observed irregular respiratory movements, especially during inspiration, a rough *bruit* due to pleural friction, a small hacking cough difficult to provoke by compression of the trachea, exaggerated sensibility of the costal region on percussion, and tumefaction of the retro-pharyngeal glands, we may conclude it is a case of thoracic Tuberculosis. Starting with this fact, M. Cagny demonstrates that the diffusion of the disease readily takes place in a shed which contained a sick animal, and considers as suspected every animal which exhibits symptoms of illness or any indisposition whatever, as well as every animal which does not thrive on the food it receives. The veterinarian should therefore examine with the utmost care every suspected animal; more particularly should he hear it cough, and then proceed to examine the chest. There is nothing absolute in the emaciation which usually accompanies pulmonary Tuberculosis, says M. Cagny; on the contrary, it appears to him merely relative to the condition of the other animals in the same shed. It is necessary to compare with each other the animals submitted to the same hygienic conditions.

M. Cagny also recommends examining the degree of adherence of the skin to the subjacent tissues, by means of a needle or the sharp point of the cannula of a hypodermic syringe. In a phthisical animal, the cannula is pushed with difficulty between the skin and the subcutaneous connective tissue.

The pulmonary lesions are nearly always accompanied by great swelling of the bronchial lymphatic glands; then to the preceding symptoms are added intermittent indigestion, characterised by tympanitis, difficult respiration marked by stertorous breathing, and obstacle to the venous circulation demonstrated by jugular repletion or the venous pulse.

(*To be continued.*)

CONTAGIOUS PLEURO-PNEUMONIA IN GOATS AT CAPE COLONY, SOUTH AFRICA.

BY D. HUTCHEON, M.R.C.V.S., COLONIAL VETERINARY SURGEON, CAPE OF GOOD HOPE.

In a report on a fatal disease among goats in the district of Khandeish, by Principal John Henry Steel, which appeared in the

Veterinary Journal (No. 171, p. 153), he refers to a report of mine on "Contagious Pleuro-pneumonia in Goats in Cape Colony," which appeared in the same Journal a few years ago (No. 13, 1881, p. 171). As that report was written at an early period of the outbreak of the disease referred to, it was, in consequence, very incomplete. I beg leave, therefore, to supply a little additional information respecting it, taken principally from my report to the Cape Government after the disease had been entirely suppressed in the colony.

I will not occupy space by giving a detailed account of all the experiments conducted during the progress of that virulent scourge, but I will simply state the facts which these experiments elicited; and as the disease has ceased to exist in South Africa, I will refer to it in the past tense.

(1) *Respecting the nature of the disease.*—It was a specific infectious form of Pleuro-pneumonia, affecting goats only, cattle and sheep remaining free from infection, although constantly exposed to it. The disease was introduced into the Cape Colony by a shipment of Angora goats from Asia Minor, where the disease is represented as being indigenous.

(2) *The manner in which the disease was spread.*—The disease was carried from flock to flock by the near contact of affected and healthy goats, a very limited space being sufficient to prevent it spreading from the one to the other. In fact, I had no proof that the disease could be communicated in any other manner than by the immediate contact of the diseased with the healthy. Neither kraals nor camps appeared to retain the infection after the disease had ceased in the flocks frequenting them.

Healthy goats placed amongst an infected flock one month after the last case of disease occurred in it, became affected with the malady. These were immediately destroyed, and the same test applied in another flock two months after the disease had ceased. In this experiment the healthy goats remained free from any symptoms of the disorder. In fact, with one exception, in which the history of the flock could not be correctly ascertained, there was no re-appearance of the disease due to the introduction of healthy goats into a previously infected flock, although numbers were so introduced after it had ceased from three to six months only.

(3) *Respecting inoculation as a preventive.*—The following statement will indicate its value:—

The total number of goats inoculated was	...	44,000
The total number inoculated a second time	...	20,000
The total number inoculated a third time	...	1,600
Total number of inoculations		65,600

The number of flocks which were affected with the disease, and in which no inoculations took place was 19, containing a total of 7,500 goats; of these 5,100 died of the disease.

The number of flocks which were inoculated *after* the disease had appeared amongst them was 12, containing a total of 12,550 goats. Of these 4,380 died.

The number of flocks which were inoculated previous to any disease appearing amongst them, but in which it subsequently manifested itself was 35, containing a total of 21,500 goats. Of these 2,860 died of the disease.

The number of flocks which were inoculated, which were free from disease at the time of inoculation, and in which no disease followed was 18, containing a total of 9,950 goats.

From the foregoing statement, it will be apparent that when the disease was allowed to run its course in a flock, unchecked by any preventive measures, about two-thirds died. When inoculation was resorted to as soon as the disease was observed in a flock, less than one-third died. The average number, it will be observed, is higher, but that is due to the fact that very few flocks were inoculated on the first appearance of the disease amongst them; a considerable number were generally affected before inoculation was resorted to, especially before the beneficial effects of inoculation became generally known.

Of six healthy goats inoculated and placed immediately after the operation in a flock of goats in which the disease was raging, five took the disease and died, and only one escaped the infection. Of seven healthy goats inoculated, and kept for twelve days before being placed in a flock of diseased goats, one only took the disease, the remaining six showed no symptoms of it.

It will be observed that a comparatively large number of goats died, even in those flocks which were inoculated previous to the appearance of any disease amongst them. The mortality under this heading occurred principally in ewe flocks. In ewes considerably advanced in pregnancy, inoculations communicated the disease to the fœtus, and abortion followed. Many of these kids were born alive; they would linger for a few days, and die of the disease. The inoculation was thus the means of introducing the disease to thirty-five flocks, principally through the medium of the diseased kids. This led to the discovery of another very important fact, viz., that the preventive effects of inoculation only lasted from four to six months. As soon as this fact dawned upon me, I recommended the re-inoculation of all flocks in which the disease re-appeared, and the prompt slaughter of all that became affected. This plan proved a complete success, except in one instance, which I will here relate. The disease

made its appearance at a farm called Groonkloof, in the Waterkloof district of the Fort Beaufort Division, on September 20th, 1881. There were 1,460 goats on the farm, belonging to three different owners. Mr. Hartzenberg owned 1,000; Mr. du Preez, 260; and Mr. Heath, 200. The disease appeared in Mr. Heath's goats. I inoculated the three flocks on September 23rd. The disease passed through Mr. Heath's flock, carrying off about the half of them, but no disease manifested itself in Messrs. Hartzenberg or Du Preez's goats until some time after, when individual cases began to occur. I then re-inoculated these two flocks, using a large dose of virus, and was considerably disappointed to find that even then the disease did not subside. I then inoculated them a third time, again using a large dose of virus, when, to my dismay, on examining the flock a fortnight after, I found that nearly every goat was coughing and exhibiting slight symptoms of the disease. About one hundred took the malady in a severe form. These were picked out and destroyed. The disease, however, kept lingering in this flock, although very few died of it, until July, 1882, when twelve cases occurred in about as many days. The disease had been practically stamped out in every other flock in the Colony, several months prior to this. Authority was, therefore, obtained, and the whole flock was killed, and their carcases buried on August 8th; the scourge has not appeared since.

In my opinion, I communicated the disease to this flock direct, by using too large a quantity of virus in the inoculations. This opinion was confirmed by direct experiment, for I found that I could communicate the disease to a large percentage—3 in 12 inoculated—by injecting a large quantity 12 minims—of the virus. The disease was also communicated to a large number by taking a small wine-glassful of the fluid found in the chest of an infected goat, and administering it as a drink to a healthy one. Again, I inoculated other two small flocks of goats three times. In the first two inoculations, I used about five minims of virus to each inoculation, and about eight minims the third time I inoculated them. Two kids only became affected in these flocks; these were killed, and no further indications of the disease appeared.

Many mistakes were made during the course of the plague, but which could hardly be avoided, as I was working tentatively for a considerable time. The following are the directions which I gave in my report upon the subject.

In preparing the virus, select a goat which appears to be suffering from the disease in the acute stage, just when it commences to give the peculiar grunt at each expiration. After cutting its

throat and allowing it to bleed, open the chest by running a knife through the cartilages of the ribs on each side of the sternum, taking care not to cut through the blood-vessels entering the cavity. Lift off the sternum, then turn over the goat and pour out the fluid contained in the thorax into a dish. After doing this, cut out the diseased lung or lungs. If the diseased lung is suitable for inoculation, it will present a bluish state-colour, and be in juicy condition when cut through with a knife. Any portions that have a dirty yellowish-grey appearance must be rejected. But when degenerative changes have taken place in the diseased lung, it becomes dry; so that little virus can be obtained from it.

There is no thickening of the interlobular tissue in the diseased lung of the goat, and which forms such a striking feature in Bovine Pleuro-pneumonia. The section of a diseased lung in the goat has the appearance of a somewhat granular-looking liver.

In expressing the virus from the lung, I cut it into thin slices, and expressed the juice from these through a piece of open sacking. I then re-strained both the fluid expressed from the lung and also that obtained from the thorax, through a piece of muslin, mixing them together.

I used a small hypodermic syringe with strong needle points, for inoculating; injecting the virus under the skin of the inner surface of the tail.

If the goats are free from disease at the time of inoculation, use five minims of the virus for a first inoculation. If they are still exposed to the infection, re-inoculate them in from one to two months' time, using eight minims of the virus for the second inoculation. Should the disease be present among the goats, previous to inoculating, it is better then to use about eight minims of the virus, as a second inoculation is not required.

History of the disease in Cape Colony.—The disease appeared amongst Mr. Van Vickerks' goats, in the Bedford district, early in March, 1881. Three days after, when I arrived at the conclusion that the disease was both special and contagious, I recommended the immediate destruction of the affected flock, but the Government did not see its way to carry out such a policy. Very soon the disease extended to a large number of flocks, after which the farmers did not think it possible to eradicate it. Seeing that there was little hope of getting the Government to carry through a stamping-out policy, I set energetically to work to try to arrest its spread by means of inoculation. Meanwhile an Act was passed empowering the Government to order the slaughter of infected goats; but no compensation was allowed in the case of animals affected with the disease. Com-

pensation was only authorised when it was considered necessary to destroy healthy animals. The result was that the Act was comparatively useless. No "Board" would order the slaughter of infected animals without having the power to grant compensation.

So matters remained until October, 1881, when, by persistent pegging away, I got a deputation to meet the Commissioner of Crown Lands and myself. At this meeting, I showed that the disease could be stamped out at a very moderate cost, if I was allowed to adopt a certain course. He granted the request of the deputation, and authorised me to proceed in the manner I had indicated, which was as follows :—

Where the disease appeared in a flock which had been inoculated, we immediately selected all affected goats, and had them destroyed, re-inoculating the whole of the remainder. Any goats that showed signs of the disease after the second inoculation were also promptly destroyed. In every instance except the one already described, this second inoculation arrested the further spread of the disease almost immediately. Where the disease appeared in a flock which had not been previously inoculated, we had the whole flock slaughtered immediately. In this manner, 3,531 goats and 2,311 kids were destroyed, and the disease was practically arrested by the end of December of the same year.

As already stated, Messrs. Hartzenberg and Du Preez's flocks were destroyed on the 8th of August following, these being the only flocks in which the condition lingered. This brought the total number of goats and kids slaughtered up to 6,640, at a cost to the Colony of about £4,000, including the cost of services of a special Board and extra police.

I may just add that goats are very subject to a non-specific form of Broncho-pneumonia when exposed to cold, rains, etc. It is, however, perfectly distinct from the Contagious Pleuro-pneumonia above described.

SUCCESSFUL OPERATION FOR THE CURE OF LARYNGISMUS PARALYTICUS, OR ROARING, IN THE HORSE.

BY J. S. BUTLER, V.S., PIQUA, OHIO, U.S.A.

At the request of Messrs. Dye and Stillwell, importers and breeders of Shire horses, Troy, Ohio, Dr. T. J. Pence of that place secured a roarer and wished me to operate on him for the cure of that disease as an experiment. Never having operated on such a case,

or seen one operated upon, we thought it best to invite several veterinarians to be present, and assist in and witness the operation. The 12th of June was the day fixed upon for the operation, and the following veterinarians were present:—Drs. W. R. Howe and W. Shaw, Dayton; J. Charlesworth, Springfield; W. A. Labron, Xenia; A. H. Logan, Bellefontaine; A. V. Derr, Sydney; T. Kerr, Urbana; T. J. Pence, Troy; J. S. Butler, Piqua.

I was assisted in the operation by Drs. Howe, Dayton, and Charlesworth, Springfield; Drs. Kerr, Urbana, and Logan, Bellefontaine, administered the anæsthetic. The subject was a gelding at least twenty years old, and in an emaciated condition. He had a chronic discharge from the nasal passages, with considerable rattling in the head and trachea. The least exertion would cause very loud roaring, and upon being severely exerted the animal would stagger and nearly fall down if not stopped. The readers of this article will no doubt agree with the writer that this was not a very favourable subject for the operation.

The animal was thrown down and secured, and a suitable stage of anæsthesia was reached in about ten minutes. The hair was clipped as closely as possible over the region of the larynx, the skin was sponged with a solution of hydrarg. bichlor., then an incision about five inches in length was made in the median line through the skin and muscles, exposing the larynx and trachea. The hæmorrhage was controlled by cold water sponging and torsion of some small vessels. When it had entirely ceased the larynx was opened, including the first two rings of the trachea. A considerable quantity of mucus, mixed with pus, escaped from the wound, coming up from the trachea and bronchi.

The true cause of roaring in this case was fully demonstrated, as the left arytenoid cartilage was perfectly immovable, while the right arytenoid was in a normal condition, and expanded and contracted at each respiratory act. The left vocal cord was severed from its anterior attachment, and it, with the arytenoid cartilage, was entirely removed. All partially detached pieces of tissue and shreds of mucous membrane were taken away by means of curved scissors. As the hæmorrhage was slight, it was not thought necessary to pack the trachea. What hæmorrhage there was was controlled by cold water, antiseptically treated with hydrarg. bichlor., and applied with small silk sponges attached to the end of pieces of whalebone. The wound was left open, as advised by Dr. Fleming, and the operation throughout was conducted as near as possible to his description of it in his work just out. After the animal had sufficiently recovered from the anæsthetic, he was allowed to rise and walk back to the barn.

A thin piece of gauze was tied around the neck, covering the

wound, and kept wet with the antiseptic solution, and a little of the solution was injected in the wound. No food or water was allowed for thirty-six hours, when a few swallows of water and some bran and oatmeal gruel was given him, which he swallowed without much difficulty. The throat was dressed antiseptically twice a day, and the diet was confined to gruel for several days, when a little grass was allowed.

On the ninth day after the operation, Dr. Pence and I threw the animal again and examined the interior of the larynx and wound. We found it in good condition, except in two or three places where the granulations were rather profuse. These we touched with a solution of argenti nitras, and continued the former treatment for four weeks, when the wound was about healed. Then a run of seventy-five yards was given him without producing any roaring.

A few days afterward, the wound having healed, the animal was turned out on grass, when the former owner one day, having a curiosity to know what condition he was in, went to the pasture without our knowledge, got on his back and galloped him all over the field, giving him a severe test, but without producing any roaring.

On July 24th, about six weeks after the operation, Drs. Pence of Troy and Charlesworth of Springfield, together with the writer, went to the pasture and tested him thoroughly by running him up hill and in every other way we could, but without producing any roaring. The respirations were somewhat harsh, which was unquestionably due to chronic thickening of the nasal and tracheal mucous membranes.

CONTAGIOUS PLEURO-PNEUMONIA CYSTS.

BY J. MC KENNY, M.R.C.V.S., DUBLIN.

A RECENT paper on the formation of cysts in the lungs of cattle suffering from Pleuro-pneumonia has been promulgated through the medium of the press.

The writer bases his theory on the fact that "in Contagious Pleuro-pneumonia the inflammatory lesions are of greater intensity than in ordinary forms of lung inflammation." No doubt the affected portion of the lungs usually in Contagious Pleuro-pneumonia become heavier than in ordinary forms of inflammation of these organs; but cysts do not occur when the extent of the intensity of the inflammatory lesions is the greatest, but, on the contrary, the more limited it is, the more frequently cysts form. Therefore it is not consistent with the whole facts of the matter to base a theory, relative to the formation of cysts in the lungs of cattle

suffering from Contagious Pleuro-pneumonia, on the fact that in the disease the inflammatory lesions are of greater intensity than in ordinary forms of lung inflammation, as cysts are not formed when the inflammation is acute or intense, but are the result of chronic torpid irritation, as indicated by the nature of the symptoms exhibited.

It is a well-established fact that ordinary inflammation of the lungs usually assumes the acute form, and Contagious Pleuro-pneumonia a chronic character; the period of incubation, as well as the symptoms of the diseases, verifying such to be the case; and the more acute the symptoms are, the fewer the cases of cysts. Whereas, in a large majority of cases in which, during life, the symptoms of Pleuro-pneumonia are not well marked, after death the cysts are found in their lungs. Thus the formation of cysts in Contagious Pleuro-pneumonia does not occur when the inflammation of the lungs approaches an acute character, being only formed when it is unusually chronic; and referring to the formation of other cysts, it does not occur in the acute stage of inflammation, but invariably takes place in the subsidiary, chronic, or reparative stage, as in the case of foreign bodies in various tissues, organs, and muscles; when they are becoming encysted, acute inflammation is not present.

External and internal influences cause inflammation of the lungs. By the former interfering with the action of the skin, particularly the sebaceous exudations, thereby preventing its important assistance to the respiratory organs, so as to produce overtaxing of the functional capabilities of the lungs; also noxious inhalations; whereas by the latter the organs are acted upon by agents in the system being eliminated by the lungs or lodged in them, thereby irritating the tissues, or making them a *habitat* for their development. The first are causes of the ordinary acute inflammation of the organs, whereas the latter is the case in Contagious Pleuro-pneumonia, it being due to organisms which may be taken into the system by the lungs only; but owing to our present limited knowledge of the subject not revealing to us the characteristics of the organisms of Pleuro-pneumonia, especially during the period of incubation, which varies from weeks to months, it would be mere supposition to state that it is or is not taken into the circulation, or that it is located in the lung tissue. However, it is certain that after a period (at present undefined) the lungs become affected, and it may be assumed that at this stage of the disease the microbes are being eliminated from the lungs, or they have made the organ a *habitat* for their active development. Under either circumstance they irritate the organ, which is indicated by

the animal having a slight cough. At first, when the cough is noticed, the irritation is so limited that, on *post-mortem* examination, and without the aid of the microscope, the change is not visible; but as the disease advances the cough is severer, the lungs becoming slightly congested in patches, which gradually become consolidated; and the closer and more rapidly they are formed the greater the irritation. When they coalesce, and the larger the extent of the coalescence, the quicker the disease advances, and the more certain the fatality. The reverse to the foregoing takes place in cases in which cysts occur; and judging from analogy, the formation of cysts may happen in Pleuro-pneumonia from the inactivity of the circumscribed congested parts acting as foreign bodies, which are encircled by chronic inflammatory products, just as a nail or any other extraneous substance would be. But as foreign bodies are not usually encased, and may only take place when the subject is one of that peculiar diathesis, or the alien substance, for some reason, not satisfactorily explained, does not cause the destructive process of inflammation attending most cases where a foreign body has been introduced. Therefore a feasible solution of the formation of cysts in Pleuro-pneumonia is: firstly, the affected animal's system may resist the irritation set up by the organism, by encircling it with white fibrous tissue; and, secondly, attenuated microbes may produce consolidation, encased as already described. These two explanatory probable circumstances may combine. The constitution of an animal may weaken the microbes, and the attenuated organisms be again introduced into a series of similarly constituted animals, which further weakens the microbes until they are rendered incapable of causing the disease in an acute form. And the fact that when cysts do occur the disease has much decreased in its virulency, supports this theory, and is elucidated by the study of bacteriology, which explains the increased or diminished waves of influences, and decimation of the pestilential micro-organisms; and how nature's ordinance and wise provision prevent them from annihilating man and beast, etc.

Thus, when deciding from *post-mortem* appearances whether an outbreak of Contagious Pleuro-pneumonia is of a virulent or mild type—provided the foregoing hypothesis be correct—the character and percentage of cysts discovered will much facilitate in arriving at definite conclusions, which knowledge contributes materially to the interests of stock owners and the public.

MANE-AND-TAIL DISEASE OF THE HORSE, OR SEBORRHŒA SICCA OR PITYRIASIS (DANDRIFF).

BY R. W. BURKE, F.R.C.V.S., A.V.D., ATHLONE.

Mr. Edgar, commenting on this form of Mane-and-tail Disease of the horse in India, speaks of the "clinical evidence to be of far more value in dealing with questions of this kind in pathology," and after calling the disease "Ringworm," gives us the following evidence in the next page, under the heading of Semeiology, namely, that in the horse "the disease is generally confined to the hind quarters, chiefly to the tuberosity of the ischium, and extending downwards to the hock. In a few cases it may extend to the flank, and perhaps there will be an isolated patch or two on the thorax, but not frequently. In the ordinary squamous form of Ringworm any part of the body may be affected. I have noticed many cases on the side of the face, shoulders, withers, and back, where the saddle or harness might convey the spores to their resting-place" (the Veterinary Journal, August, 1889). In fact, the disease was seen to attack every other part of the body but the localities usually chosen by the disease with which we are dealing.

We quote from another source as to the characters of Ringworm in the horse. "Herpes tonsurans in the horse," say Friedberger and Fröhner, "is most frequent on the back, croup, flanks, and on the head. Each patch is of the size of a two-shilling piece, and is in general perfectly round. The hairs are either completely shed or are broken off. The shedding of the epidermis is marked, and frequently leads to a light crust-formation. The hairs which are around the diseased patches are easily pulled out, and those which grow subsequently are usually of a darker colour" (*Lehrbuch der Spec. Pathol. u. Therapie der Hausthiere*, 1886).

It is interesting in this connection to note a few characteristic points regarding the disease with which we are dealing, namely—

(*a*) It is often confined to the hairy parts, as the mane and tail in the horse, whereas Ringworm attacks all parts of the body indiscriminately. It is remarkable how the fungus selects the mane and tail always, and in this respect differs in no way from the fungus found in that disease (Pityriasis) seen in man, where it also attacks covered parts of the skin in preference, particularly the chest, scalp, pubis, etc.

(*b*) Its almost universal confinement to the hot weather. It has

been remarked by Mr. Edgar that "moisture favours this disease, which is generally prevalent in wet weather;" whereas we know that the Mane-and-tail Disease of the horse appears, almost throughout India, as a rule in March, or at the latest by April, and the rains do not begin till June or July of each year.

(*c*) Its cure is spontaneous during the winter. Ringworm is never so apt to get well of itself, in such numbers, on approach of each cold weather.

(*d*) The complete absence of any "increasing circles" always present in Ringworm. Not infrequently the eruptive spots in Ringworm are crowded together, so that a more or less continuous patch of papules is formed, but at the outlying parts and in the early stages the circular character of the eruption can always be detected.

(*e*) Non-transference of the disease to the syces and soldiers who have the grooming of both healthy and affected animals, for half an hour daily during stables, throughout the year.

(*f*) *Apropos* of the fungus and its special characters, about which there seems to have been so much discussion lately, it is manifestly impossible to attempt to generalise from a single point, as it would become yet more difficult and misleading were it not for the well-founded belief that the disease is not dependent for its development upon this parasite solely, but upon the concurrence of many conditions of almost, if not quite, as much importance as its implantation in the cuticle.

Mr. Edgar refers to a fungus described by Mr. Haslam, and emphasises this officer's designation that it is the Ringworm parasite, that it acts as the tricophyton does, and is probably contagious by a method of "deep" inoculation. Of this suggestion there does not seem any improbability; for we do not know from what cases Mr. Haslam took his material for examination, there being so many kinds of skin disease in India, and cannot therefore either affirm or deny the identity of Mr. Haslam's fungus and the tricophyton which gives rise to Ringworm. Without attempting to say which parasite it was Mr. Haslam had to deal with, we do not hesitate to assert that a fungus known as the *Microsporon furfur* gives rise to the skin disease Pityriasis versicolor, *which is different from tricophyton present in Ringworm.* That Mr. Haslam's parasite was not the *Microsporon furfur* may be gathered from his description of it. Mr. Haslam (Veterinary Journal, March, 1889) says the fungus presents "hyphæ in which are seen conidia or spores," which he believes to be "identical with the fungi of the various Ringworms."

Mr. Edgar quotes authorities to show that the "achorion, tricophyton, and microsporon are *exactly alike*," and also that

"*Oidium lactis** is identical"—an opinion which recognises no difference between blastomycetæ and hypomycetæ in general, but regards them as of a common type. So that it is not easy to define which fungus is meant here.

After bringing forward the opinions of various writers on Ringworm, Mr. Edgar proceeds to give us "clinical evidence" to prove the "identity of *Tricophyton tonsurans*, *Achorion Schon.*, and *Microsporon furfur*." Sufficient it is for us to state here that the *Microsporon furfur* is distinct from both of these, not only in its microscopical features, but also in the clinical characters of the disease in which it has been noticed; for although it has been stated that the *Microsporon furfur* is similar to the tricophyton, it presents marked differences from the latter.

We are indebted to Mr. Edgar for putting this subject particularly before the profession, if only for the fact that it shows how often we leave behind us evidence of chief importance, because it does not pertain to the point which mostly interests us for the time, or from other causes. It is unreasonable to throw so much stress on one section of the disease, and rob what portion of our attention may fairly be assigned to the others, which are, I venture to believe, sufficiently encouraging to justify a further study of the clinical phenomena in this disease.

Differential Diagnosis.

1. Ringworm is never confined to the mane and tail with such regularity as is this disease, but the skin of the whole body is affected; whereas seborrhœa is almost always—at least, in its origin—a disease of the mane and tail in the horse. 2. Not infrequently the eruptive spots in Ringworm are crowded together, so that a more or less continuous patch of papules is formed; but at the outlying parts and in the early stages the circular character of the eruption can always be seen. 3. The Mane-and-tail Disease of the horse is attended with decided but not excessive itching; the latter will, however, depend upon the amount of folliculitis present. 4. Ringworm is more decidedly a local affection, unassociated with the constitution of the patient; whereas Steatorrhœa sicca, or Mane-and-tail Disease in the horse, we know, is associated

* Among the parasitic yeasts occurring as epiphytes upon the skin, the Saccharomyces capillitii met with in this disease exerts very little, if any, pathogenic effects. At one time this was known by the name of *Oidium albicans*, and considered to be a mould fungus allied to *Oidium lactis*. Little oval cells are formed by this yeast fungus, which are sometimes united in chains, and at other times growing into threads, resembling mycelia, which are several times as long as they are thick. These fungi possess no mycelium proper, nor as a rule do they produce spores. But in artificial cultivations spore-formation may be brought about by special conditions.—R. W. B.

with the constitution of the animal—with his method of feeding, the climate, and other causes. The latter disease is curable, moreover, by the use of diuretics and other agents, independently of local attack, which is hardly the case with Ringworm. 5. Mane-and-tail Disease in the horse begins in the hot weather, and ends each winter; and I cannot think the term Ringworm is a suitable one for a disease that runs a definite course. 6. When the hairs fall out over a patch (as sometimes happens in Ringworm) it is entirely covered again by the growth of natural or coarse hair; but in cases of long standing the hair in Steatorrhœa never recovers its full vigour of growth (witness the "stumpy" tail of the horse described by the Germans). 7. Veterinary surgeons in Australia have described an allied form of skin disease in the horse, so they tell us, which consists in the presence of "minute organisms in the cells of the cuticle and in the hair and its follicles." The Australian practitioners are among the first supporters of the parasitic theory. Mr. Haslam has recently become its most powerful exponent, and he carefully describes the characters of the fungus. In both their descriptions there is a complete absence of any feature at all resembling that found in the *trichophyton;* while with regard to the Australian practitioners' observation of "minute organisms" as the "essence" of the disease, some dermatologist has truly remarked that this fungus was "*Torula vulgaris*, which is present in all epidermic desquamations."

(*a*) The sudden onset of the Mane-and-tail disease, (*b*) its frequent recurrence after intervals of freedom, (*c*) its special liability to attack particular parts, (*d*) its spontaneous cure, and (*e*) loss of hair (alopecia) characterising its course are not symptoms that we are accustomed to meet with in the known parasitic affections of the type of Ringworm.

Tinea tonsurans has been successfully propagated by inoculation. In Mane-and-tail Disease "deep" inoculation is recommended, and even then no case of success has been hitherto recorded. It should be noted that the Mane-and-tail Disease of the horse may be masked by an attack of *Tinea versicolor*. That they are occasionally met with together is only what we might expect, since they are both diseases of hot countries, and especially India. The Mane-and-tail Disease is distinguished from Tinea tonsurans and Pityriasis versicolor by the character of the parasite, and by the definite course it runs and its subsidence, which are characteristic.

The Australian practitioners describe the disease in the horse as spreading sometimes along "the entire length of the back to the root of the tail," frequently seen in *Steatorrhœa corporis* of man,

which is also situated on the back between the shoulders, and extends down the central part of the lumbar region, etc.

Further, while we have never seen any formation of "rings" in Mane-and-tail Disease of the horse in India, I would observe that papules which have a tendency to spread at the circumference into the form of rings may be witnessed also in some forms of Steatorrhœa.

Finally, Mane-and-tail Disease of the horse may be mistaken for a rather rare disease sufficiently defined to require notice, namely, Pityriasis maculata et circinata of Bazin, for which Dr. Gustav Behrend, of Berlin, has suggested the name Furfuracea herpetiformis, which was for long thought to be Herpes tonsurans, and which Hebra and his pupils describe as acute Herpes tonsurans maculosis. It appears to be quite certain, according to the leading dermatologists of to-day, that this disease is not Herpes tonsurans, and that we have to do with a well-marked and independent disease of the skin.

The subject of this form of disease common to the tropics requires to be studied anew in its broader aspects, as well as investigated by the bacteriologist. Above all, the precise nature of the parasite requires to be accurately determined, and then the next step will be to determine whether the disease is communicable, for if not the parasite can only be looked upon as concomitant. As a matter of fact, the disease is not communicable by the ordinary methods of inoculation, and we have found that when it has been seen to be most prevalent among the horses not one case was witnessed among the syces and soldiers who had the grooming of the latter. Nor, so far as we know, has there ever been an instance of the communication of the disease from one horse to another standing in the same stable.

FRACTURE OF THE TIBIA IN A GREYHOUND.

BY FRED. C. MAHON, M.R.C.V.S., SOUTHREPPS, NORFOLK.

I DO not claim originality in this article, but simply state facts connected with a good and a speedy recovery, noting a few particulars of material interest relative to fractured tibia of the dog—"compound-comminuted variety." An aged bitch (greyhound). Whilst pursuing a hare, and most probably in turning, undue tension of the powerful femoro-tibial muscles, extension of the limb, and bodily weight combined brought about the state of things here alluded to; or the fracture was, as alleged by her owner, due to her having come in contact whilst running, with a stick or stubble in the course pursued on this occasion. However, such has little to do with the interesting case, its peculiar and marked symptoms

and extraordinary recovery, when I state that from the time the fracture occurred, to her placing her bodily weight upon the limb, no more than twenty-eight days elapsed ; and when, as alleged by authorities on fractures, as Haller, Paget, Duputyren, etc., that in the third stage of reparation which extends from the twentieth to the twenty-fifth day, the fibro-cartilage between the periosteum and bone, and that between or within the medullary canal, are both converted into bone, the external forming a ring-ferrule or clasp, and the internal a plug or peg, filling up the medullary canal, and together constituting the provisional callus, we see this state of things fully realised. Every care was taken of the greyhound by her master, she being warmly bedded, diet cool and nutritious, bowels regulated by Pil. Aloæ et Pot. Bicarb. and tonics, as Parish's syrup of phosphates, ferri sulph. et quinieae sulph. ; constant changing of patient when bed-sores began to appear to opposite side, and quietude carried out as far as practicable, formed the main outlines of medicinal treatment. Briefly, a *resume* of what was done surgically may not be uninteresting at this stage.

October 11th. Ends of fractured tibia (three as far as could be ascertained) closely approximated, animal being placed under the influence of chloroform.

On November 1st this was taken off, and the calico bandage eased by cutting, to allow of an examination of the parts beneath, caused by the rapid progress of my patient, and a desire to examine a wound which occurred at the postero-internal part of the hock, on the fifth day after fracture.

On November 4th I removed the calico bandage in its entirety, substituting belladonna tape, heated by an iron made warm and passed rapidly over ; the leg was enveloped in the same, and the leather bandage re-applied.

No disfigurement of the limb this day, November 8th, apparent ; bitch standing on it, bearing weight, and stretching, to ease her cramped body and muscles, after fixed position for so long.

Plaster of Paris bandage applied, overlaid with tow, saturated with Burgundy pitch, the whole enveloped by a strong calico bandage, the ends being stuffed with cotton wool to prevent them causing friction to any marked degree. This was allowed to remain until the 15th, when a leather bandage was applied, one corresponding to the leg, midway (femoro-tibial) longitudinally and in circumference, padded supero-internally with tow, a space one-and-a-half inches in length, same in diameter for point of "hock" to penetrate, also padded marginally ; space anterior to "hock" likewise, and laced by leather lace from top to bottom, which kept the leg as primarily semi-flexed, or, to be accurate, in

about the position as a sound animal rests weight upon ordinarily whilst at a walk.

I considered the case hopeless at first, but at the owner's special request, I made a trial of her as an experiment, and with gratifying results; we hope shortly to breed from her, as I advised her owner to do so, and not to risk another fracture by using same *for "coursing."*

A fracture is said to occur in three ways: 1st. By external violence operating upon the injured part; 2nd. By external violence producing such concussion upon the bone as not to break it where the force is applied, but at some other part; 3rd. By inordinate action of the muscles, as in broken back, and with some bones as the pelvis, thighs, shoulders, pasterns, leg, vertebræ, and of the face, and skull more frequently than others in the horse. In the dog, the leg and thigh bones. The bones of the young are less liable to fracture than those of the old.

Atrophy, and fragility produced by gradual inflammation, partaking of a chronic nature, degeneration of bone, as in Fragilitis ossium, and Necrosis, being among the chief predisposing causes. Having in canine practice employed the following adhesive agents as plasters, viz., Plaster of Paris, pitch plasters, belladonna, india-rubber, etc., I prefer Plaster of Paris, alternated with belladonna for dogs, especially for the larger ones, if worth treatment, and "pitch."

The value of medicinal agents as adjuncts to reparation is debateable; still, in some cases, salts of phosphates, iron, etc., do good.

Some authorities recommend in fractures that holes should be drilled in the fragments with the ordinary drill, and fixing the same in apposition with ivory pegs driven into the drilled holes.

This idea suggested itself to me when puzzled as to the most efficacious mode of proceeding, at first; but I am pleased such was not needed, though strong in the belief of the practical utility, and further trial of this ingenious idea.

Fracture of the tibia in the dog, as in most of the domesticated animals, is of an oblique nature, the compound-comminuted being highly dangerous, and except occasionally unsuccessfully treated. In the pig I have successfully set a fractured tibia; this animal, as a rule, makes a rapid recovery from fractures, and by many country practitioners it is not considered *infra dig.* to be worthy of attention. The œdema of the foot of the fractured limb is but slight up to the end of the first fortnight, and rapid setting of the limb being accomplished, true approximation of the fractured ends being secured, patience and perseverance of both the owner and myself brought about a condition of things highly satisfactory.

Editorial.

THE EXTINCTION OF RABIES.

We are again in the midst of an impassioned discussion on Rabies, and the measures required to limit or suppress that harassing disease. This time, as usual, the excitement has been roused or stimulated by the malady becoming more common in London and suburbs, and, as a consequence, deaths occurring among people from Hydrophobia, due to the bites of rabid dogs. The measures adopted are the ordinary perfunctory, irregular, localised, and therefore impotent and vexatious attempts with which we are so familiar. There can be no doubt that these feeble and useless efforts are due more or less to apathy to look upon the matter in a serious and sensible light, and also to sentimental notions entertained by the lovers of dogs against restrictions which are likely to cause inconvenience to themselves or discomfort to their pets. As Rabies is generally only communicated by the bites of infected dogs, the chief, and indeed the one measure to be most rigidly observed in extinguishing the disease is that directed against biting, by the enforcement of the muzzle regulation. The arguments employed by the sentimentalists against the use of this article need not be referred to here; suffice it to say they would, if applied to horses, forbid the wearing by these animals of harness, bits, or shoes. We now know sufficient of Rabies to affirm that it can be completely extinguished in a given period, if diseased dogs can be prevented wounding healthy ones; and in this the muzzle must play a conspicuous part, because if it is properly constructed, a dog wearing it cannot bite, and a dog at large without it should not be tolerated. Whether any special dogs should be exempted is a matter for consideration. Hitherto, exemption has only been sought for sporting dogs; and certainly, so far as foxhounds are concerned, they need not be included in any muzzling order, inasmuch as they are most carefully watched, are kept isolated except when hunting, and are never allowed to straggle. There is not an instance on record in which foxhounds have been instrumental in spreading the disease, though they have been frequently infected by strange dogs while in the field.

It is to be hoped that the legislature will soon see fit to take this important subject in hand. For years we have insisted upon measures being adopted for the complete extinction of Rabies in these islands, and there should be little difficulty or trouble experienced in effecting this. Getting rid of such an alarming disease means not only freeing mankind and animals from the risk of infection, but it implies relieving dogs and their owners from the inconvenience and hardship of the present desultory, and all but useless regulations, which are constantly resorted to whenever an alarm is raised. Rabies should be an unknown disease in the United Kingdom.

FORAGE FOR MILITARY PURPOSES.

BY GEORGE FLEMING, C.B., LL.D., F.R.C.V.S., PRINCIPAL VETERINARY SURGEON OF THE ARMY.

(*Continued from page* 275.)

The experiments on the Continent, and particularly the success attending those in the German and Russian Armies, appear to have led to an earnest desire to perfect our system of foraging horses on active service; and a Committee was therefore appointed in 1878, to make inquiries into the various kinds of compressed forage used in foreign armies, or manufactured in this country, with a view to the best being adopted for the British Service. Such forage was to fulfil the requirements of field operations, in being—

1. Portable, both for carriage by land transport and on board ship.
2. Possessed of good keeping qualities.
3. Retaining the maximum of nutritive properties after the process of compressing has been carried out.
4. Being of a nature admitting of horses changing to or from their ordinary food, without avoidable risk.

Having been appointed a member of the Committee, which continued its investigations for three years, I can testify to the anxious care with which its investigations were conducted, and the caution exercised in arriving at conclusions. A large number of samples of forage of different kinds were submitted and examined, and among them various sorts of horse biscuits and compressed hay and grain. Of the biscuits, Barthe's, composed of oatmeal, pea-flour, rye-flour, and linseed meal, and which had been tried in the French Army and unfavourably reported upon, was not accepted for trial; but Spratt's biscuit, made up of wheat, oats, beans, maize, dates, and other ingredients, and the German Army biscuit (known as Warnecke's), the composition of which I have already given, were experimented with. Spratt's biscuit was tried in 1878 on horses of the Army Service Corps and 16th Lancers, and found unsuitable.

In view of the favourable reports published in Germany and Russia, the German biscuit was submitted to rather prolonged and extensive trials at Aldershot, Woolwich, and London, in 1879, on cavalry, horse artillery, and Army Service Corps horses, but the results were generally unsatisfactory. Experiments also made with a biscuit supplied by Colonel French (20th Hussars), were no more successful, and the Committee came to the conclusion that "cooked food in the form of biscuits is unsuitable for the horse's ration," because (1) of its too rapid assimilation, and, when given alone, of its insufficient bulk; (2) horses do not take it readily—some horses persistently refused to eat it during the seven days' trial; (3) it might find its way into the camp kettle; (4) its great expense, £18 to £28 per ton; (5) difficulty in carrying it; (6) tendency to produce internal derangement.

3. *Compressed Forage.*—The opinion of the Committee was well founded, and the first and last reasons given for rejecting this biscuit forage were quite sufficient, in themselves, to justify their decision. Horses will not perform hard work on cooked food, it would appear, and their ration must possess a certain bulk. Their anatomy and physiology are such that though they only eat a small quantity at a time in a natural state, yet they should be fed frequently, and their food should produce such a feeling of repletion by its volume as to satisfy the appetite.

The essence of a large ration might be given in a very minute quantity, yet hunger would not be appeased, and the animal would lose condition. Therefore it is not so much to concentration of the nutritive properties of forage for army purposes that we should look, as to compression of the

ordinary forage, and in such a way as to make it as portable and conservable as possible. Panification of the food will not answer, and especially for horses exposed to weather, and which have to undergo severe fatigue. Compression, after suitable preparation of the ordinary forage, was then decided upon by the Committee for experiment. What was known as "Davis' Compressed Forage," consisting of bales of hay and oats mixed, had been already tried in North China, Abyssinia, New Zealand, and South Africa; its only advantage was reduction in bulk, a ton measuring from 55 to 70 cubic feet. Its disadvantages I have alluded to. It was sought to effect a still further reduction in bulk by having the grain and hay compressed separately in smaller quantities, and in a form better adapted for distribution and digestion. The great improvement in compressing machinery, and in the art of compressing which had taken place, rendered this an easy matter.

A "grain-cake," as it was termed, was introduced by Captain (now Lieutenant-Colonel) Graves, 20th Hussars, and this appeared to be the most desirable form in which the grain food should be presented. But the Graves' cake was composed of crushed maize, oats, beans, and so many other ingredients of uncertain nutritive value, and so different to the ordinary forage, that the Committee decided to reduce the number of constituents, and to have a compressed grain forage of simpler and more reliable composition. A cake was accordingly prepared, per ration, as follows:—

Oats, crushed	7·25
Beans ,, ...	1·00
Linseed ,, ...	0·25
Hay, chopped	0·50

This grain cake was intended to replace the ordinary oat ration; and from its composition, and the fact of the grain being crushed, it was thought that 9 lbs. of it would be equivalent to 12 lbs. of uncrushed oats. Long-continued, extensive, and thorough experiments were made with it in the cavalry, artillery, and Army Service Corps, in stables and on picket-lines, and with the most satisfactory results. After being fed for a month on a ration of 9 lbs. of the cake and 8 lbs. of hay per diem, the horses looked well, though in some instances undergoing severe work. It was considered, however, that for the heavier horses especially the allowance was rather small, and particularly in camp. The grain appeared to be thoroughly masticated and easily digested—an important point when considering the condition of tired or old horses, or when time is scanty. With regard to diminution of bulk, this was also found to be fully achieved. One ton of the cake occupies 38 to 40 cubic feet, while a ton of oats requires 80 to 100 cubic feet; the reduction which can be effected in the ration (say 1 lb. per diem) is also an important feature in connection with transport. The composition of the cake is also such as should meet all the requirements of a typical grain food for hard-working horses, and is a great improvement upon the oat ration.

For facility of transport and issue, the crushed grain was made into rectangular cakes weighing 18 lbs. each—a day's ration for two horses; four or five of these being made up into a small bale, securely bound.

The keeping qualities of the cake were found to be good; it was sent to different parts of the world, kept there for a considerable time, then returned to England and examined, when it was found to have undergone little, if any, change.

In the words of the Committee's Report: "Horses thrive on it, take to it readily, and change to and from it, with reference to their ordinary forage, without detriment to health or condition."

In their inquiry the Committee were not unmindful of that other essential

portion of horse's food—the hay. The difficulties attending its provision, storage, and transport in the field; its inflammability, and its great tendency to become mouldy and otherwise damaged when exposed to wet and other influences; and the great loss sustained in issuing it and feeding it on the ground to horses; induced them to try chopped hay compressed into dense cakes, like those of grain, and of the same weight. The result was again perfectly satisfactory. When hay is cut into short lengths—about three-quarters of an inch—and pressed into cakes of this description, it forms not only a most convenient and very portable article of forage, so far as transport and issue are concerned, but its keeping qualities are greatly increased, while it is almost uninflammable, and is nearly waterproof. The saving in cubic space alone is something extraordinary; for while one ton of the ordinary compressed hay in iron bands occupies 135 cubic feet, one ton of the hay cake measures only 45 cubic feet. It was estimated—and the estimate was found, on experiment, to be correct—that 9 lbs. of hay cake (two rations in each cake) were equal to 12 lbs. of long hay; so that the amount of cubic space required for one horse's rations of the latter, would contain four rations of hay cake. When this chopped hay is given to horses in suitable nose-bags, there is no waste whatever; very different is it with long hay thrown on the ground before the horses in wet or windy weather. Mastication, too, is much easier, and there is not the risk of horses swallowing soil, gravel, and other injurious matters, as when they are fed on the ground. On the line of march, also, the immense inconvenience of carrying voluminous hay-nets suspended from the saddle is avoided.

By having the hay and grain separate, several important objects are attained. The horses can have a larger or smaller allowance of each; if hay or grass can be procured within the zone of operations then the hay cake need not be given. As the result of experiments at Aldershot, there is reason to believe that a force might be detached on a reconnaissance for four days, each trooper carrying four days' rations of grain cake (36 lbs.) in the nose-bag, supplementing this with whatever hay, grass, or straw might be obtained on the line of march; while an additional two days' supply might easily be carried in the squadron carts of regiments, and on the ammunition wagons of the artillery.

When horses are fed with the hay and grain cake, these should be mixed in each feed, as it saves time, and is more economical. To do this, however, a larger nose-bag is required; and one was devised by the Committee which answers the purpose admirably. As is well known, the present nose-bag is of very little use. It is so small as only to hold one feed of oats; is soon worn out by the ground (during the Zulu campaign the average wear of the nose-bag was a fortnight); owing to the horse tossing up his head to get the oats in his mouth, much is wasted; and the weight is entirely supported by the horse's head. The improved bag is sufficiently large to hold a full feed of grain and hay cake, or three days' rations of the former. When worn by the horse it is horizontal instead of vertical as with the present bag, and the weight is borne by the head and body. The bag never comes in contact with the ground, and therefore the amount of wear is so much diminished that it should last for a very long time. The comfort of the horse when feeding is very much increased—as he eats from the upper side of it; there is no fouling by the breath; nor is there any waste of forage, while the animal can breathe quite freely. By means of the cords attached to each bottom corner of the bag, and which serve to suspend it to the body, when it is filled with grain cake to be carried on short expeditions, it can be lashed to the saddle. This bag was also tried in the Aldershot experiments of 1880, and reported on most favourably by the different regiments.

I have alluded to the use of bran on shipboard and in the field, and to the

trouble and risk there is usually experienced in carrying and preserving it. When compressed into cakes, like the grain and hay, the trouble and risk are at once got rid of. It is easily carried, and if not exposed to much damp will keep for a very long time. One of the cakes of bran now before you, weighing 25 lbs. and containing two bushels, has been compressed for more than twelve months. I may mention that one ton of bran in sacks occupies 150 cubic feet, but when compressed into cakes it requires only 40 cubic feet, being a saving of 110 cubic feet per ton.

In every way this compressed forage has answered well, and has met all the requirements of an army forage. It is very portable, keeps well, is easy of issue, does not waste if properly given, is readily masticated and easily digested, contains the nutriment in a sufficiently concentrated form, while it possesses the necessary amount of bulk to prevent horses feeling dissatisfied when they are fed; is not very combustible; and it consists of the ordinary food of our horses.

As I have said, these cakes are made up into small bales, containing four or five cakes, covered with canvas and bound by light iron bands, and are well adapted for either wagon or pack-saddle carriage. They appear to be damp-proof, and are certainly bullet proof.

In addition to the extensive trials made of this forage at home, it has undergone satisfactory tests in Egypt and the Soudan, and also in India. In India the forage biscuit was tried in 1881, and failed; whereas the hay and grain cakes answered well, forming an excellent forage, and their keeping qualities were found to be good—a year's test having been imposed. I understand that the Indian Government contemplates preparing large quantities to be kept in reserve, and it is reported that the French Government look with favour upon this kind of forage, and are about to lay in large quantities of it. Considering this the best kind of forage for military purposes—that is for field service, it may be hoped that there are means in this country by which it could be readily supplied when needed. The machinery to prepare it cannot be extemporised in a few days, and if it is to be supplied by private firms, some demand for it must exist all the year round, for the reason that there would be no demand for it except for army purposes. The system of securing supplies of this kind for the army rather militates against the adoption of the compressed forage, as the tendency is towards extreme economy during peace, and extravagant expenditure in war-time.

In order to accustom the Commissariat and the horses to this war forage, and manner of using it, as well as to encourage manufacturers of it, a certain quantity should be used annually—say, not less than 1,000 tons—and a day's ration given to every troop horse once a fortnight, or even once a month; a stock to the same amount being always kept on hand for emergencies. I am strongly of opinion that everything done with, and for, men and horses during peace, should be in the nature of a rehearsal for war; so that there should be no confusion, dislocation, or defection when troops have to take the field.

Before a manufacturer of this forage can turn out, say from one to two hundred tons a week, he must spend a large amount of money in laying down machinery, and if this is not regularly employed, there is not only the loss of interest on the capital, but the machinery itself soon becomes damaged. Therefore, unless we are to find ourselves in an unpleasant fix with regard to forage should a war occur, we should not only have a good reserve supply on hand, in order to avoid having to pay a most exorbitant price if an emergency arises, but there should also be provision made for a constant supply to meet all demands of active service.

I should have liked to have referred at length to the supply of forage to army horses during peace, but time will not admit of my doing more than briefly noticing it. Those who, like myself, have given the subject some

attention, must have come to the conclusion that the present system is unsatisfactory in several respects, and that probably much improvement could be effected, and a large money saving made, if army horses were foraged on the principle in operation in large civilian establishments of horses, such as the omnibus and tramway companies. Take, for instance, the London General Omnibus Company, which at two forage depots prepares and delivers prepared food for more than 10,000 horses. The objection which would probably be raised to such a system is, that it would be impossible to prepare forage in London and deliver it at a distant station, say, Aldershot, as cheaply as it would be to purchase unprepared forage at that station. This objection might be met, however, by pointing out that such places as London, Liverpool, and Hull are the great centres for forage of all kinds, and its price everywhere else is governed by its price at these markets. For example, supposing a quarter of oats in London costs 15s., and the railway carriage to Aldershot is 1s., the market price at that place would be at least 16s. 6d. or 17s. per quarter, the extra amount being the merchant or contractor's profit.

Then again, buying in large quantities, as the Government would do, the supplies would be procured direct from the grain ships, and thus the factor's and merchant's profits would be saved.

The same argument would apply to the procuring of hay. The growers would be only too pleased to submit their samples, and, if approved, sell direct to Government as a consumer, at a price as low, if not lower, than to the hay dealers in whose hands they must place themselves, often not knowing how or when they will receive payment.

One other objection may possibly be raised, viz., that it would be detrimental to the English farmer if the Government were to purchase supplies in, say, the London market. But a simple answer to this would be, that under the present system Government buys from the contractor, who, in his turn, purchases from the London merchants. Foreign oats (the present contract prices are so low that none but the cheapest Russian oats can be purchased), or even those of home growth, the Government could buy direct, as the price suited. The advantage to the public and the horses would, I am certain, be very great, and we should get rid of bad forage, peculation, light weight, and all the other evils which cause so much trouble and dissatisfaction. As regards delivery of forage from the railways to the barracks, there should be no difficulty about this, as cavalry, artillery, and infantry have their horses and wagons.

I regret that time will not permit me to refer to the quantity of forage allowed to army horses, a subject of much importance, and which is well worthy of discussion; but I must forbear, and, in conclusion, ask you to aid in throwing as much light as possible on the different points I have been, by your kindness, allowed to touch upon in this paper, in order that our army may benefit to the largest extent from your experience and observation.

BACTERIOLOGICAL STUDY OF THE LESIONS OF BOVINE CONTAGIOUS PLEURO-PNEUMONIA.

At the *séance* of the Academy of Sciences of Paris, held on September 9th, a note was read from Professor Arloing, of the Alfort Veterinary School, on the above subject. He remarked that Willems and Van Kempen, in 1852, had signalised the presence of fine molecular granules in the exudate from the lesions of contagious Pleuro-pneu nia; but the first attempt to demonstrate the really microbic nature of the virus was made by Bruylant and

Verriest, of Louvain. In 1880 these two experimentalists thought they had found in the lungs of diseased animals a characteristic *micrococcus*, which they had cultivated in various broths. They, however, did not continue their investigations, which were forgotten until 1882, in which year Pasteur announced before the Agricultural Society of Melun that the virus of this disease was not cultivable in ordinary broths. Nevertheless, two years later, Pœls and Noles stated that the exudate of the diseased lung contained micrococci altogether like those which Friedlander asserted he had discovered in human Pneumonia; but the researches of Lustig (1885) did not confirm this statement. That authority had isolated from the lymph of freshly inflamed parts—1. A bacillus which liquefied gelatine; 2. A micrococcus, the colonies of which resembled boiled white of egg; 3. Another micrococcus differing from the preceding by the golden-yellow colour of its cultivations; 4. Lastly, another micrococcus, the cultivation of which on gelatine is similar to that of melted yellow wax. The latter microbe offered bacillary forms associated with round ones, in such a way that its most constant character is derived from its colour. Cornil and Babes have also touched on this subject; but the results they obtained were not very precise, for in 1886 they estimated that their researches were to begin again, and in this appreciation they embodied all the observations of the authorities who had preceded them.

Such was the state of the question when Arloing undertook his investigation. He observed that in the serum which flows from a cut made into a diseased lung, there are seen microbes which are few relatively to the importance of the lesions; they are in the form of very short bacilli, and isolated micrococci unequal in size, or associated two and two. The pulmonary serum being immediately spread on nutritive gelatine by means of a platinum thread or fine pipette, the colonies which grow from this sowing furnish four different kinds of microbe—1. A bacillus which promptly and completely liquefies the gelatine; 2. A non-fluidifying micrococcus, the white colonies of which resemble drippings from a candle; 3. A micrococcus whose white colonies are spread in a thin layer which becomes ridged and folded as it becomes old; 4. Another micrococcus in elongated or circular colonies, which assumes a fine orange-yellow tint. It appears certain that Lustig had isolated the first two, but he must have observed as Nos. 3 and 4 a mixture of the Nos. 2, 3, and 4 of Arloing.

Arloing proposes to name the first *Pneumo-bacillus liquefaciens bovis*, the second *Pneumo-coccus gutta-cerei*, the third *Pneumo-coccus lichenoides*, and the fourth *Pneumo-coccus flavescens*. It is possible that the *Pn.-gutta-cerei* and *Pn.-flavescens* correspond to the *Microc. cerens albus* and the *Microc. cerens flavus* of Passet; but Arloing could not assure himself of this by comparison.

A certain number of characteristics would go to prove that there are really four kinds of microbes in the serum from the lungs of cattle affected with contagious Pleuro-pneumonia. Thus, the two first mentioned are optionally ærobic and anærobic; the last two are exclusively ærobic. The *Pneumo-bacillus* vegetates only at 3·5° Cent.; the *Pneumo-coccus lichenoides* does not develop on potato, while the three others do so vigorously. And it is well to know that they offer curious examples of polymorphism. The *Pneumo-bacillus*, which is very short, sometimes half-round in broth, becomes elongated, slightly thickened, and regular in shape in gelatine. The *Pneumo-coccus gutta-cerei* increases in volume, and the *Pn.-lichenoides* becomes pseudo bacillary on solid media.

The micrococci are nearly always in union with the pneumo-bacilli in more or less large numbers, in all those points of the pulmonary lesions which are in a state of active inflammation, and even in the sequestra; but notwithstanding this co-existence, it is impossible to attribute to the four microbes an

equal share in the genesis of Pleuro-pneumonia, and it is probable that only one of them is the sole and essential agent of the virus.

Determination of the Microbe which Causes the Contagious Pleuro-pneumonia of the Ox.

Following up his paper read at the *séance* of September 9th, Arloing presented another to the Academy of Sciences on the 16th of the same month. In this he remarks that the determination or identification of a pathogenic microbe is complete when, by inoculation of its cultivations, we can reproduce the lesions from which it proceeded. Such identification is difficult to obtain in Pleuro-pneumonia, for up to the present time it has not been possible, except in rare instances, to reproduce the disease in the ox by intra-pulmonary inoculation with the natural virus or in any other way. The experimentalists have merely produced a local tumour in the loose subcutaneous connective tissue, which tumour extended slowly, and was often accompanied in young animals by metastatic synovites. Such a tumour invariably caused death by the products which the specific microbe secreted in its substance, and which were gradually absorbed into the system. If the animal chanced to survive, it became almost proof against further inoculations, and possessed immunity.

Arloing determined to reproduce with the cultures of the microbes described in his other paper, either the connective tissue changes above-mentioned or the pulmonary lesions, but he did not succeed without having to overcome many obstacles.

Lustig having obtained, by the first inoculation of his orange-coloured microbe, a small fugaceous subcutaneous tumour, and by a second a still more voluminous tumefaction, thought he might compare these insignificant effects with those of the pulmonary serum, and surmised that this microbe was the producing agent of Pleuro-pneumonia. For Arloing the specific microbe is the *Pneumo-bacillus liquefaciens bovis*, and the following was the manner in which he proved it to be so :—

If half a cubic centimetre of the cultivation of each of the above-described microbes is inoculated at two different places in the connective tissue of a calf, at each point will be formed a flat, œdematous, hot, and painful swelling, which almost disappears in five or six days, only a somewhat persistent nodule remaining. The most extensive tumefaction is produced by the *Pneumo-bacillus*, then in decreasing order comes that caused by the *Pneumo-coccus gutta-cerei*, *Pn.-flavescens*, and *Pn.-lichnoides*. If several successive generations are inoculated, a time arrives when the *Pneumo-bacillus* alone produces a local effect. Inoculated into the lungs, the trachea, and the veins, the same cultivations have not given rise to Pleuro-pneumonia.

The results obtained in this way are certainly far from being like those produced by the fresh pulmonary serum, for all the microbes contained in that appear to lose immediately the greater part of their special activity by cultivation. Nevertheless, it may be remarked that the *Pneumo-bacillus liquefaciens* is that of which the cultivations produce phenomena most analogous to those of the fresh virulent serum. This is an argument in favour of Arloing's hypothesis, which becomes still more probable if it is added that the *Pneumo-bacillus* is found in all the diseased lungs, while one of the other three microbes is sometimes absent; and it also exists in the metatastic synovites which occur far from the subcutaneous tumour; while the general effects of its secretory products and of filtered pulmonary serum are similar.

These diverse considerations led Arloing to inquire whether pure inoculations of a more energetic Pneumo-bacillus might not give more satisfactory results. It had been noticed that the special activity of the pulmonary serum

could be increased if the microbes could be grown beneath the skin of a healthy ox; and in afterwards isolating the liquefying bacilli contained in the subcutaneous tumour, chance produced more active organisms than those obtained directly from the lungs. The cultivations Arloing made in this way were subsequently inoculated—(1) into the lungs and pleura; (2) into the veins of the ox.

In the lungs four centimetres produced immediately trembling, quickened respiration, cough, and hyperpyrexia. A month afterwards, at the autopsy of the animal, there were found false villous membranes on the visceral pleura, and centres of chronic Pneumonia disseminated in both lungs.

In the veins twenty centimetres caused the death of young bovines weighing from four to five hundredweight, in eight hours, after a series of very remarkable accidents. At the autopsy there was found acute congestion of the lungs, and all the intercostal spaces were infiltrated with serum, as in recent cases of Pleuro-pneumonia. Eight centimetres injected in two doses, at an interval of a few days, caused immediately accidents similar to the foregoing, but not so severe, and to them succeeded dyspnœa and intermittent digestive disturbance; during the first days mucus streaked with blood flowed from the nostrils. When the animals were killed at the end of a month, the bronchial and mediastinal glands were found to be swollen, while in both lungs there were observed scattered red or white patches with small pseudo-purulent nuclei, corresponding to the lesions described by writers as marking the chronic forms of epizoötic Pleuro-pneumonia. So that it did not appear doubtful, notwithstanding the rapid progress of the *processus*, that the pathogenic agent had been inoculated.

Arloing injected into the jugular of a calf, in thirty-six hours, twelve centimetres of natural serum containing the strengthened virus. In a few days the animal showed a single but very important localisation; the autopsy, made twenty-six days after inoculation, showed that the interlobular and subpleural lesions of the Pleuro-pneumonic lung were developed in the connective tissue of the external crural region. In addition, a great number of sowings on gelatine, made with the serum from these lesions, yielded only colonies of the *Pneumo-bacillus liquefaciens.*

Thus it appeared demonstrated to Arloing that, so far as his experiments went, the *Pneumo-bacillus liquefaciens* is really the living and essential element in the virus of bovine contagious Pleuro-pneumonia.

NOTES ON AN EPIZOOTY OF RABIES; AND ON A PERSONAL EXPERIENCE OF M. PASTEUR'S TREATMENT.*

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(From the Cambridge Pathological Laboratory.)

TOWARDS the end of July last, I was consulted by Dr. C. Scott Kilner, the medical officer of health for the Bury St. Edmund's district, concerning a disease which was rapidly carrying off the fallow deer at Ickworth Park, the seat of the Marquis of Bristol. The disease was supposed to be Anthrax, and as at that time some fresh Anthrax material was wanted for our laboratory work, I gladly availed myself of the opportunity to visit Ickworth along with Dr. Kilner, in order to make a *post-mortem* examination upon one of the dead deer, consent having previously been obtained from Lord Bristol's agent.

From the keepers and others at Ickworth, I learned that it was only through

* From the *British Medical Journal*.

the chance discovery of an unusual number of dead deer lying in the thick bracken that suspicions were aroused as to the presence of any disease. Living in a half-wild condition, deer do not lend themselves readily to accurate and continuous observation. When any member of the herd is ailing it leaves or is driven away from the rest of its fellows, and seeking some retired spot, dies in hiding. It is impossible, therefore, to state with any exactitude the time of onset of the outbreak.

From the beginning of July up to the 20th of the month, twenty-three dead bodies were discovered; during the next seven days, with more careful search of the whole park, ninety-two were found and buried; and now for the first time symptoms of illness were observed each day in a certain number of the does and young bucks (prickets). The fact that during this first period of the epidemic only does and young bucks were affected is worthy of note, although capable of easy explanation. For the greater part of the year the adult bucks keep themselves in separate herds away from the does, often, indeed, occupying a different region of any park. Accompanying the does are the prickets, or young bucks, which have not completed their second year, and the haviours, or castrated bucks. To this fact is probably largely due the difficulty of arriving immediately at a correct diagnosis of the true nature of the epidemic, or rather epizoötic. The symptoms of the disease which I was able to gather on my first visit were of a very indecisive nature. All that could be learned was that, leaving the herd, the animal affected—a doe, or fawn, or young buck—appeared uneasy and distressed, wandered about aimlessly, at times essaying a run, and then suddenly stopping short. As the disease progressed the gait became staggering, the hind quarters appearing specially weak, and finally the animal dragged itself into the bracken to die. Death occurred, as a rule, within thirty hours after leaving the herd.

Upon making a necropsy the blood was found dark and almost black, remaining liquid; the liver and kidneys were congested; the lungs unaffected; the spleen somewhat larger than normal, dark, almost black in colour, and very pulpy. Decomposition apparently set in with great rapidity. Incomplete though the *post-mortem* examination was (being made in the open during a heavy shower), all these symptoms and appearances seemed not opposed to the idea that the disease was Anthrax. I noticed at the time that the skin was not so congested as is usually the case in this disease, but considered that this symptom might be specially marked only in cattle suffering from Anthrax.

Returning to Cambridge, in the full expectation of finding Anthrax bacilli in the portions of the spleen, liver, and kidney that I had carried away with me, I was greatly surprised at being unable to discover in any part a single typical bacillus, notwithstanding the greatest care in the preparation of the specimens. Nor were the attempted cultivations any more successful. There were several growths of putrefactive micro-organisms, none of the Anthrax bacillus. Soon after this I learned that having obtained evidence of the presence of characteristic bacilli, the Privy Council had recognised the disease as Anthrax, and that the park had been officially declared an infected area under the Contagious Diseases (Animals) Act. This fact led me to conclude that I had perhaps been mistaken in my conclusions concerning the disease; I therefore thought it desirable to make further inquiries into the subject. In the meantime, in answer to certain questions addressed to Mr. Turner, Lord Bristol's agent, I obtained fuller information about the symptoms that had so far been noted. I learned, namely, that the keeper had observed the affected animals during the early stage of the disease to throw their heads back in a curious manner, to bite their shoulders, legs, and sides very frequently, at times inflicting severe wounds upon themselves; to jump up (rarely) and bite at the boughs of trees. Further, the gait might be described as becoming more and more "groggy," until at last the animal fell down—to rise again, proceed onwards,

and again fall—the hind limbs becoming increasingly paretic, until at last the animal died, death being very often preceded by convulsions. These symptoms are not those of Anthrax. The possibility of the disease being Hydrophobia having naturally occurred to me, it appeared desirable to make further necropsies.

On August 8th, with the aid of Professor Roy and in the presence of Dr. Kilner and Messrs. Johnson, senior and junior, the veterinary surgeons in charge of the diseased animals, I made two more *post-mortem* examinations at Ickworth upon a full-grown doe and a haviour respectively. Nothing very abnormal was found beyond what was seen in the first necropsy. We brought back to the laboratory sealed pipettes containing spleen juice and blood from the heart, which had been filled with the usual precautions, as well as gelatine test tubes inoculated upon the spot. We also preserved the brains and cords of the two animals.

On microscopic examination of the blood and spleen juice no bacilli were discoverable. No traces of the bacilli showed themselves in any of the gelatine tubes, nor again in the tissues could any typical Anthrax appearances be made out. It may be mentioned in passing that during the course of the second of these two *post-mortem* examinations I gave myself a slight cut upon the right index-finger with a knife which had been used to incise the brain and cord of the first animal. To this matter I shall shortly return.

To obtain proof positive of the nature of the disease, Professor Roy, to whom I have throughout been indebted for much kindly counsel and assistance, willingly made the necessary inoculations. His investigations, a report of which is appended,* proved to us conclusively that the disease from which the animals died was not Anthrax, bnt the paralytic form of Rabies.

But if further evidence were wanting, we obtained it towards the middle of August. The epizoötic, now no longer confined to the does, haviours, and prickets, began to manifest itself among the adult bucks, and we received information that they had been observed attacking each other and butting violently at trees. One animal was observed to chase a hare, another angrily snatching at and biting a large stone, while a third rushed upon one of the assistant keepers, who happily escaped. Again, it is to be noted that although a large herd of sheep and numerous ponies had shared the deer

* Note by Professor Roy.—The disease in question was officially declared to be Anthrax, but in accordance with Mr. Adami's views on the subject, it was decided that a rabbit should be inoculated from the brain of one of the deer at the same time that some of the blood of the dead fallow doe was introduced under the skin of one of the thighs. This was done by me on August 9th, 1889. A portion of the medulla having been rubbed up in a clean mortar with a small quantity of sterile decoction of meat, a small quantity of the mixture was introduced under the dura mater, which had been exposed by making a small trepan hole through the vertex of the cranium. The wounds healed by first intention. On August 27th this rabbit, which till that date had not shown any symptoms of disease, was found to be paretic, the weakness being recognisable chiefly in the hind limbs. It screamed for some time after being simply lifted on to a table, although this was done gently enough. On August 28th the paresis was much more evident. On August 29th, in the morning, the rabbit was, so far as could be seen, completely paralysed, with the exception of the respiratory muscles. It died on the afternoon of the same day. *Post-mortem* examination showed no noteworthy abnormality, although the brain and spinal cord were very carefully examined. On August 30th I inoculated two other rabbits subdurally from the medulla of the one which had died on the previous day. On September 15th one of these showed the characteristic paresis, and it died on September 16th with symptoms identical with those of the rabbit from which it was inoculated. The second of the two rabbits inoculated showed paresis on the 16th, and died on the 17th September. The conclusion is, of course, that the deer from which these animals were inoculated died of Rabies and not of Anthrax.

park until as late as July 20th, and one of the animals had been observed licking a dead deer, up to the present moment no symptom of a similar disease has evidenced itself among them. Were we dealing with Anthrax, this immunity would be fitted to cause surprise.

Rabies among deer had been almost wholly unknown until Mr. Cope published last year his excellent report upon the outbreak at Richmond Park. The manifestations at Ickworth agree in all important points with those described by him, save that I have never been able to observe or obtain a description of the removal of the hair from the forehead, as a result of continued forcible rubbing of the head against trees and posts. Ascending paralysis would seem here to be more frequent and to be specially common among the does, while it would seem to be mainly in the adult bucks that what may be termed the typical symptoms of Rabies, accompanied by great nervous excitation, make themselves evident. At Ickworth also the disease has spread to all the separate herds of deer, and we have the interesting though lamentable sight of Rabies, not in a series of isolated cases, but as a well-marked epizoötic. Since the disease was first observed, less than three months ago, over 450 animals have died in a herd of between six and seven hundred animals—a terrible mortality, and one very much greater than obtained at Richmond.

So long ago as 1881 Galtier recorded some cases in which by the intravenous injection of the emulsified cord of a rabid animal he conferred immunity upon sheep and dogs. More recently Nocard and Roux * have confirmed Galtier's results, and have shown that it is possible, by a single injection of a fairly large quantity of a thick emulsion of "rabic" medulla, to render sheep and cattle immune. It would be useful, not to say interesting, to determine whether by following this method some portion at least of what remains of the herd at Ickworth could be saved. But up to the present I have not been able to obtain Lord Bristol's permission to attempt anything of this nature.

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The cut upon the finger which I gave myself while making the *post-mortem* examination on August 8th was allowed to bleed freely, and then washed well for some minutes with carbolic acid solution (1 in 20). It healed slowly, but without any suppuration, and I was disposed to think very little about it, especially so long as there was uncertainty as to the diagnosis of the disease. There have been fairly numerous cases in which practitioners have wounded themselves in the course of necropsies upon those dead from Rabies, and, almost without exception, no ill results have ensued. Here, for some time after the wound had been inflicted, there remained considerable doubt as to the nature of the disease. When, finally, the diagnosis of Rabies seemed perfectly certain, medical friends insisted strongly upon the fact that the knife by which I had cut myself had been used previously to dissect the brain and spinal cord of a rabid animal. Hence, seventeen days after the event, as the result of earnest solicitations from Professor Roy and others, I found myself beginning the treatment at the Pasteur Institute. From M. Pasteur, Dr. Roux, and every member of the staff I received the greatest kindness, and I was freely permitted to examine into every detail of the method. Dr. Ruffer's address to the Association at Leeds was so full and convincing that little is left to be said with regard to M. Pasteur's method. I cannot refrain, however, from recording my testimony to the extreme care that is taken to ensure accuracy in the treatment and security to the patients from any untoward results, and my admiration for the wonderful precision that regulates each step in the preparation and inoculation of the virus. For the benefit of those who in the course of their practice are called upon to deal with cases of bites from animals supposed to be rabid, it is perhaps wise to emphasise the fact that, as Dr.

* *Annales de l'Institut Pasteur*, 1888, p. 341.

Roux has shown, the freshly removed brain and cord of rabid animals may be preserved for long periods, without loss of virulence, in pure neutral, or rather non-acid, glycerine; and that sending specimens so preserved to the Pasteur Institute, it can there with certainty be determined whether a given animal was or was not rabid.

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In concluding these notes it may be as well to mention a train of symptoms of a somewhat ambiguous nature experienced by me. I do this with no little diffidence, yet so few cases of like nature have been placed on record that I feel it wise not to pass the matter by unnoticed. Within a day or two after the cut I became aware of a sensation in the forearm of the injured extremity, by no means acute enough to be termed a pain, but rather akin to the feeling one obtains in a limb after excessive muscular exercise. In time the same sensation made itself evident along the inner side of the arm. Considering this due to the irritation of some small nerve at the seat of the wound, I paid very little attention to it. It persisted, however, for some weeks, in fact throughout the period of treatment at Paris. From about the twenty-sixth day I woke regularly in the early morning, to find the limb in a state of "pins and needles." The condition lasted for several minutes; then disappearing, it permitted me to fall asleep again. Rarely was one of the other extremities affected, and it was only after the phenomenon had occurred without fail for more than a week that I called to mind that it might be allied to the "tinglings" described as a premonitory symptom of Rabies. From September 5th onwards—I had wounded myself on August 8th—I began to suffer from insomnia, not falling off to sleep until between 1 and 4 a.m., and from now I became more and more depressed. The depression was completely in spite of myself. I had no reason to doubt the efficacy of the treatment that I was undergoing, and looked upon it, not as necessary, but as precautionary, and as, on the whole, a pleasant experience. From September 8th this depression was constant; the dull heavy sensation in my arm became more marked, and soon I experienced great distaste for being alone for any length of time. On the 10th, while making my homeward journey, a tightening or constant slight constriction of the throat made itself felt. These symptoms became more and more strongly marked until the 14th, when for one short moment I found I could not swallow the saliva. That night, however, I fell asleep fairly soon; the next morning the depression had passed away, and although during the next few days I at times experienced some slight tightness of the throat, and awoke on some mornings to find my arm in the state of "pins and needles," I very soon felt myself in a state of good health, the last symptom to disappear being the heavy sensation in the arm. Taken altogether, the symptoms were at the worst not very prominent; they were, however, most decidedly uncomfortable.

What is the interpretation of these symptoms? On the whole I am inclined to believe them of nervous origin, pseudo-hydrophobic. In favour of this view it may be pointed out that certain signs of Rabies which are generally well marked, such as for instance pain at the seat of the wound, were characteristically absent; other signs, for example, the tingling in the extremities, were incomplete in their manifestations, and though present, might be otherwise explained. But, on the other hand, not a little can be said against the purely nervous theory. I am of robust health, sound constitution, and in temperament should describe myself as the very reverse of nervous. My belief in the efficacy of the Pasteur treatment is and was throughout complete. I knew at the time that, having been inoculated, the chances were even more than ninety-nine to one that I should not be attacked. So slight did I consider my danger that on August 22nd, but for the urgent entreaties of Professor Roy, I should have started for the Broads, instead of for Paris; and I fully

acquiesced with the authorities at the Pasteur Institute, when upon the thirteenth day of treatment they informed me that they considered my case such that they did not think it necessary to keep me for the usual fifteen days of treatment.

If indeed I passed through a most mild abortive attack of Rabies, then certainly that attack was due to the cut I gave myself, and not to the treatment I underwent. The time of the first appearance of the symptoms, namely, about the twenty-sixth day after the cut, would show this. The pain, if pain it may be called, in the injured extremity only, while the region of inoculation was completely painless, would evidence the same, while the fact that it was not until the seventeenth day after the infliction of the injury that I presented myself at the Rue Dutot would again add to the probability that symptoms should manifest themselves in spite of the treatment. It is impossible to avoid the feeling that, had I not gone to Paris, the symptoms, if only nervous in origin, would, in the want of that sense of security gained by undergoing the treatment, have developed themselves to a most painful extent; if of the nature of Rabies, would, failing the treatment, have become lethal; and that I owe to M. Pasteur and those at the Rue Dutot my heartiest thanks, not only for the courteous way in which I was received and treated, but perchance also for the continuance of my days.

PRELIMINARY REPORT OF THE BOARD APPOINTED TO MAKE FULL INQUIRY INTO THE ORIGIN AND NATURE OF A PREVALENT DISEASE AFFECTING STOCK, COMMONLY KNOWN AS "MANGE," IN QUEENSLAND.

(*Continued from page* 283.)

Taking these in the order mentioned may be considered—(1st) *bichloride of mercury* or *corrosive sublimate.* This, though a poisonous body which should not be brought immediately into contact with skin abrasions, is very powerful as a "germ" destroyer, a 1 in 1,000 solution being as effective in a few minutes as is a 5 per cent. solution of carbolic acid in forty-eight hours (Koch). A very strong lotion may be made by dissolving in 2½ pints of water 1 oz. of corrosive sublimate, 2 oz. of sal ammoniac, and 4 oz. of nitre; but this should be diluted, when used, with not less than three times its bulk of water. A non-irritant preparation of this chemical is an albuminate of corrosive sublimate, made by dissolving one part of this salt in 100 of the blood serum of the horse (procured by removal of the clot from drawn blood) or in egg albumen. The substance thus procured may be advantageously applied to abraded and inflamed surfaces. In this connection it may be worth while to suggest experiment with the use of very mild nitrate of mercury or citrine ointment.

Iodine, the ointment according to the formula already adopted by veterinarians, and containing iodine, iodide of potassum, or a lotion in which the same substances occur. Iodine, however, is most conveniently applied when dissolved in oil; and the following method, available when cod-liver oil is used, might be attempted in the case of other oils also:—Triturate the iodine with half its weight of iodide of potassium, and add gradually the oil, so as to form a uniform mixture. After standing a few hours, all the potassium iodide will be found at the bottom of the flask, leaving the iodine in perfect solution (Eymael).

Boracic Acid.—Borax (*sodic diborate*) combined with glycerine in the proportions of 2 parts of borax to 9 of glycerine, a 100 to 200 grains to the pint solution in hot water, or an ointment made with 8 ounces of borax to the pound of the menstruum—preferably commercial vaseline. Preparations of

borax, too, will relieve the itching—a prominent symptom of the disease—and may be applied also advantageously to broken surfaces.

Sulphur Acids.—Preparations containing sulphuret or sulphide of potassium (formed on fusing a mixture of 1 part by weight of sulphur and 2 parts of carbonate of potash), such as the ointment made by rubbing up (1) 1 oz. of this substance, finely divided and dry, with 6 lbs. of lard or vaseline; or (2) 5 oz. sulphuret of potassium, 2 lbs. soft soap, 2 lbs. lard, and 12 oz. olive oil (Gishurst's compound may be substituted for this ointment); or (3) the following lotion, known as Barlow's, containing sulphuret of potassium 1 oz., sliced soap ½ oz., limewater 15 fluid ounces, and proof spirit 4 fluid ounces; or (4) simply a solution of this salt in water, of strength 1 oz. to 1 quart. This last solution must be kept well corked up. Sulphide of sodium as an ointment made by mixing 3 oz. of this substance with 1 lb. of lard or vaseline. Hypo-sulphite of soda, with glycerine and water. A weak solution of sulphate of copper or blue vitriol, even so attenuated as 1 part in 1,000 of water; and sulphur itself, which owes its potency to the evolution of sulphurous acid, in the form of an ointment containing 1 part by weight of sulphur to 2 parts of the menstruum. The use of all external applications containing sulphur are likely to be more efficacious if this body is also administered internally.

Among agents grouped as belonging to the carbon series may be mentioned (1) carbolic acid (phenol or hydrate of phenyl), with glycerine—about 2 oz. of the former to 1 pint of the latter, or, stronger still, 5 oz. of the former to the same quantity of the latter; or preferably in the form of aceto-carbolic solution, made by mixing 5 parts of pure carbolic acid with 20 parts of acetic acid (vinegar in larger proportion where this is most accessible), and then adding 75 parts of water, or it may be used mixed with oil; (2) creasote, with which (*a*) an ointment may be prepared containing not more than 1 drachm to 2 oz. of the menstruum employed, or (*b*) a lotion made in a similar manner to the aceto-carbolic solution, creasote being substituted for carbolic acid; or by mixing 2 oz. of creosote and 3 oz. of liquor potassæ with 4 pints of water. Salicylic Acid: A solution of 4 grains of this substance in 2 pints of spirits of wine, or of salicylate of soda in water. Tobacco: Two or more preparations of this substance are available—(1) made by gently boiling 1 lb. of bruised fresh tobacco leaves in 12 lbs. of lard or other fat until the leaves are crisp, when they may be strained off; (2) by digesting for some hours 1 part of tobacco leaves bruised and 8 parts of olive oil. The latter preparation is sometimes known as oil of tobacco.*

To allay the Irritation.—In the first instance care should be taken that additional irritation is not occasioned by the employment of caustic remedies. Its relief, and so the prevention of the secondary results, of the disease, is brought about by the action of some of the above parasiticidal bodies, especially that of the borax preparations, or may perhaps be effected by the use of a cyanide of potassium solution (one ounce to the gallon). It must be remembered, however, that this last chemical is a violent poison, and should not be applied where the skin has previously been wounded, and perhaps, also, its application to large surfaces would produce deleterious effects. Solutions of alkaline carbonates (those of soda or potash) of the same strength in the case of each may also be advantageously employed. But the fact must not be overlooked, especially in so much as the epidermis is not innervated, that this irritation arises from the presence of dead or dying matter in contact with a sensitive skin, and that the itching, therefore, will be diminished if

* The use of such bodies as tallow, fish oil, tar, petroleum, or kerosine oil (especially in the form of an emulsion) and also of patent substances generally, especially when in the composition of such bodies there are active principles identical with or related to those above suggested for adoption, will naturally occur to the thoughtful reader.

steps are taken to assist nature in the natural process of eliminating this. Oiling the affected surface and washing with soft soap, or with a solution containing 1 oz. of carbonate of potash to the pint of water and diluted, when required for use, with an equal quantity of water, will accomplish much in this direction.

General Treatment.—Investigations have not proceeded far enough to allow of its being pronounced whether any constitutional treatment should be adopted, much less what is the nature of the requirements in this direction.

Treatment of Secondary Conditions.—The skin abrasions, inflammatory or otherwise, and loss of condition, are to be dealt with obviously in the ordinary way.

Cattle.

The disease in cattle affects very much the same parts of the body as it does in horses, and its presence may be recognised even at some distance by the peculiar erectness of the hair over the shoulder, rump, and especially on the root of the tail. Any difference in its general character when this class of stock is affected by it, is of a minor description, and dependent on the fact that the hide as well as the hairy covering of cattle differ from what represent them in horses. The secondary effects of the disease are also similar to those in horses, but, owing no doubt to the toughness of their skins, are less pronounced, and although the hair is shed in plenty and much scurfiness is produced these features are less noticeable than in the case of either horses or sheep. Careful examination of affected skin, skin detritus and hair derived from the living animal, has led me to the discovery of the same vegetable parasite in their case as in the other classes of stock, and permits me to pronounce that the disease is identical in them all. Any treatment given to affected cattle must perforce be suggested by what is applicable to horses, and although no doubt they will usually be left to the influence of the *vis medicatrix naturæ* (to shift for themselves)—the fact must not be overlooked that whilst these cattle carry the disease they are constant sources of infection for other classes of stock. It will sometimes happen, however, especially when working bullocks are concerned, that curative remedies will be sedulously applied. It has been previously remarked that the carcases of these animals are in no way affected by this superficial skin disease, and the statement is only repeated here to give proper emphasis to the fact.

Sheep.

Symptoms and Morbid Anatomy.—When the disease occurs in sheep no symptoms manifest themselves until the portion of the body-surface involved is injured to its full extent, and patches of wool are shed, leaving at first a pinkish glistening surface, which soon becomes covered over with a scab formed by exuded serous fluid, under which healthy wool-bearing cuticle is developed. The patches of various dimensions occur at different parts on both sides of the sheep affected, and as long as the disease lasts there may be a continuous development of fresh ones, or, by peripheral extension and gradual invasion of previously unaffected surface, an enlargement of those already formed. Owing to the dense manner in which the individual fibres of wool arise from the skin, and also to the fact that their deeply planted roots have a curvilinear direction, individual fibres or fragments of scarf-like cuticle cannot be shed, as in the case of the horse and ox. It therefore happens that the whole of the tissue affected comes off bodily together.

In handling a sheep and opening the wool, spots of a light yellowish-brown colour occupying the base of the fibres is the earliest symptom of the presence of the disease observable. These spots next extend their area, and then the wool commences bit by bit to be shed in small locks. It comes out

to the full depth of the roots, and is held together inferiorly in compact little portions well circumscribed at their original bases of attachment, which are elongated, measuring $\frac{1}{2} \times \frac{1}{4}$ inch or more in diameter, or rounded. These little locks are agglutinated by a moist opaque material, occupying a depth in the wool of about one-tenth of an inch, white below and yellow-brown above; this gives rise to the brown spots previously noticed. This material is found on examination to be almost entirely composed of epithelial cells with a little exuded matter, and both these as well as the wool fibres, especially at their base, which are often denuded of part of their cuticular sheath and thickened, contain large numbers of the same minute fungus sporules so characteristic of the disease in horses,* and which when they are found in this situation are easily isolated.

Beneath the discarded wool, even at so early a stage as when this has to be removed by the hand, the true skin is already developing a new cuticle. Sections of this tissue viewed under the microscope are exceedingly interesting, exhibiting as they do the new cuticle with a few fibres of wool in a very early stage of development.

It must be borne in mind that the scabs are purely secondary productions and are not ominous of evil, and that beneath them a new crop of wool is arising which will shortly push them off.

Subjects for further Inquiry.

I. Whether any particular condition of vitality in the affected animal is favourable to the development of the pathogenic operation of the parasite; and if such a condition exists, what then is the nature of this condition, on what does it depend, and how can its presence be done away with.

II. If no such condition can be found, are there other conditions favourable which do not discover themselves by producing a changed vitality, afforded by—(*a*) the state of the weather during any period of time; (*b*) a peculiar character in the soil dependent on its physical or chemical state; (*c*) a change in the constitution or nature of the fodder dependent on the influence of circumstances *a* and *b* acting singly, successively, or in concert.

III. Can any light be thrown on the origination of the disease in the Colony.

IV. What is the life history of the parasite considered apart from its relation to the animal in which it occasions disease, and the action of bodies or conditions on its destruction, or the retardation of its development; is it naturally brought under the influence of these. Solution of these questions would throw light (1) on its method of producing disease; (2) the duration of its inert stage after brought in contact with a body capable of taking the disease, and (3) the precise nature of curative and preventative remedies.

V. The limit to which this disease in stock is contagious, and whether it can be conveyed to human beings, and *vice versa*.†

VI. Prognosis of the disease.

HENRY TRYON.

Brisbane, 22*nd March*, 1887.

Note.—Since the foregoing Report has been in the hands of the Minister, the *Sydney Mail* of 24th March, 1888, has come to hand. This paper contains a report made by the Government Veterinarian of N.S. Wales, to the Secretary of Mines of that colony, on the result of an inquiry into the same disease

* These must not be mistaken for the few cocci of Streptococcus pyogenes which occur in the little purulent matter which is sometimes present.

† Medical testimony on this point is forthcoming, but facts bearing on the question have not yet been brought directly under the notice of the writer.

in stock conducted during a visit to the Brisbane district, this officer having been deputed to proceed to Queensland for the purpose of investigating it. The memoir referred to comes too lately to hand to meet with criticism here; and, moreover, some of Mr. Stanley's propositions have been already met in the thesis now submitted. Here only it seems pertinent to remark,—why designate, as this investigator suggests, the disease *Prurigo*, and so give to it the name of a well-known disease in stock not due to such a cause as that to which he attributes this one? Why not describe it as an epidemic form of Confluent Ringworm?—H. T.

[This appears to be a very serious outbreak of cutaneous disease which, from the description given in this report, we are inclined to regard as Scabies rather than Ringworm. It certainly corresponds in its salient features to wide-spread invasions of Scabies we have witnessed among horses, especially in the Crimea. If proper search is made for it, the animal parasite (sarcopt or psoropt) should be found. In such a country as Queensland, treatment must be difficult and expensive. Common oil, Stockholm tar, and sulphur, in certain proportions, form an effective and cheap dressing, whether the disease be Ringworm or Scabies; but it must be thoroughly applied, and other sanitary measures should be carefully enforced.—Ed. *V. J.*]

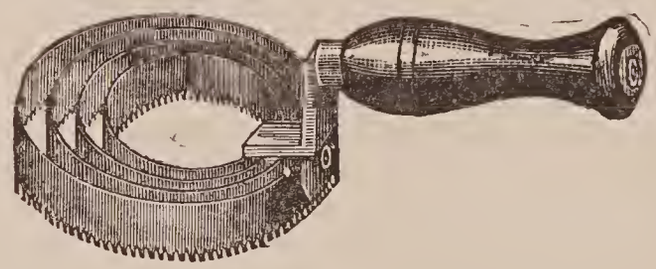
DEATH OF A MEDICAL PROFESSOR FROM GLANDERS.

A melancholy death from Glanders occurred recently in Vienna. Dr. Hofmann von Wellenhof, assistant to Dr. Gruber in the Institute of Hygiene, and who was only twenty-six years of age, had under his care a groom who had become infected with Glanders from one of his horses, according to one account. Another is that, at the end of September he was engaged in some experiments on Glanders, for which the material was furnished to him by Dr. Kowalski, a military surgeon, who devotes much time to bacteriological and hygienic investigations. Dr. von Hofmann's object was to ascertain whether the cultivated bacilli of Glanders were virulent, a point as to which he felt some doubt. About October 8th he fell ill with fever and pains on the left side of the chest. Physical examination detected pleuritic crepitant *rales*. After a slight apparent improvement, rheumatic symptoms supervened on October 13th. About the same time Dr. von Hofmann gave himself two injections of morphine, using a sterilised syringe belonging to the Hygienic Institute. Fever and general prostration increased daily, and in eight days more erythema-like knobs appeared on the skin; these, after a few hours, developed into purulent vesicles and abscesses. When taken into the General Hospital, on October 22nd, Dr. von Hofmann presented the symptoms of Glanders. He died on the following day, and the *post-mortem* examination confirmed the diagnosis. It also showed that the supposition of an infection through the hypodermic syringe was quite erroneous. This supposition was, immediately after the necropsy, publicly contradicted by Professor Kundrat, the director of the Anatomo-Pathological Institute, who examined the body. The following are the conditions which were found: innumerable metastatic nodules and abscesses of Glanders in the skin, the muscles, etc., etc.; the subcutaneous cellular tissue, however, even that around the sites of injection, was quite free from infiltration. There were, however, several infiltrations in the larynx, the trachea, and the left main bronchus. The cellular tissue of the posterior mediastinum was pervaded with partly yellow, partly purulent infiltrations, of the size of two centimétres. The infiltrations under the left pleura and along the ribs and the lymphatic vessels in that situation extended outside the chest; in connection with this

the deep muscles of the back were infiltrated with pus. On the left side, there was severe hæmorrhagic pleurisy; as also on the right to a lesser degree. The spread of the infiltrations was in favour of an infection through the air passages, particularly the trachea. The question as to how the infective substance arrived there was hardly possible to be answered.

A HUMANE AND ECONOMICAL CURRY-COMB.

SPRATT'S Company, Limited, of London, has just patented and brought out a new curry-comb, which deserves the notice and recommendation of the veterinary profession, because of its great advantages over the ordinary instrument, the defects in which are known to every horseman. Curry-combs are necessary in countries in which horses, for climatic reasons, have long coats at certain seasons, in order to free the skin from epithelial *débris* and dirt; but heavy-handed and unmerciful grooms only too often render it an instrument of torture when applying the rigid tool with which we are familiar, to the epidermis of very sensitive horses. The new comb should



protect such animals from this torture. Being a coiled steel-spring, it combines with the strength of metal all the elasticity of a brush, and fits into every hollow of the horse's body, thus doing away with the rasping of the ordinary curry-comb. It is cleaner in use, as dirt, etc., cannot collect in it, and horses can be groomed much quicker. It has also the advantage of being cheap, while it is made in two qualities, nickel-plated and japanned. As a hygienic and effective stable implement, it should quickly supersede the present tormenting and unsatisfactory curry-comb.

Proceedings of Veterinary Medical Societies, &c.

ROYAL COLLEGE OF VETERINARY SURGEONS.

SPECIAL MEETING OF COUNCIL, HELD OCTOBER 22ND, 1889.

Professor J. WORTLEY AXE, President, in the chair.

Present: General Sir Frederick Fitzwygram; Dr. Fleming; Messrs. J. Roalfe Cox, W. F. Mulvey, H. R. Perrins, William Wilson, George Thatcher (Solicitor), and A. W. Hill (Secretary).

The SECRETARY read the notice convening the meeting.

On the motion of Mr. WILSON, seconded by Dr. FLEMING, the minutes of previous meeting were taken as read and confirmed.

The SECRETARY said he had received letters from the following gentlemen regretting their inability to attend the meeting:—Professor Walley; Messrs. Briggs, Kidd, Lambert, and Taylor.

The PRESIDENT stated that a special meeting of the Council had been convened for the purpose of confirming the following resolutions, which were

passed at the quarterly meeting on the 9th October, for altering the Regulations for the Examination of Veterinary Students in General Education as follows :—

1. "That Section 2 (page 61 of Register) be amended thus : by striking out the first sentence of the clause and substituting in lieu thereof, 'Students who do not produce one or other of the certificates referred to shall be examined by a Board of Examiners appointed by and under the direction and supervision of this College, to whom they shall report the result of the examination, which shall be uniform and applicable to the whole of the United Kingdom.'"

2. "That Sub-section 2 of Section 1 of the Regulations for the Examination of Veterinary Students in General Education shall be altered by inserting the word 'or' between the words 'first' and 'second' on the first line thereof, and by striking out the word 'third' on the second line thereof."

Mr. WILSON said he had great pleasure in moving that the resolutions be confirmed, for it was highly desirable that the educational test should be of an uniform character throughout the United Kingdom.

Dr. FLEMING seconded the motion.

General Sir FREDERICK FITZWYGRAM said that in some quarters there appeared to be a little uncertainty with regard to the examinations. He should like, therefore, to ask whether the students passed their Matriculation Examination before entering the schools, or only just before their first professional examination, which would be about a year after entry into the schools.

Mr. WILSON said that the College as a licensing body had no control over the schools. Its business was to see that gentlemen before presenting themselves for examination had passed such educational test as it deemed sufficient to admit them into the profession.

The PRESIDENT said that, so far as refers to the London school, students were not admitted to the College until they had passed their Preliminary Educational Examination ; but he understood that this was not universally the case.

Mr. J. ROALFE COX agreed with Sir Frederick Fitzwygram that it would be advisable for the student to pass his educational test before entering upon his studies for the first professional examination.

Dr. FLEMING said that on a former occasion when the matter had been brought up it was felt that the Council could not exercise any power with regard to the admission of students to the schools.

General Sir FREDERICK FITZWYGRAM said that, admitting the College had no power, he thought the expression of the Council would go very far to putting a stop to the abuse.

The PRESIDENT observed that the Council might perhaps be able to exercise some moral control over the schools.

The motion for the confirmation of the resolutions was then put and carried.

A vote of thanks to the President was carried.

MIDLAND COUNTIES VETERINARY MEDICAL ASSOCIATION.

THE Quarterly Meeting of the above Association was held at the Bell Hotel, Derby, on November 8th, under the presidency of Mr. E. Beddard, Wolverhampton.

The members present were :—Messrs. H. Blunt, W. H. Blunt, C. Barnes, J. Burchnall, W. S. Carless, R. H. Cartwright, J. Coe, H. Collett, F. C. Golden, O. J. Hills, E. Hodgkinson, F. B. Jones, D. Fairbank, J. Malcolm, T. H.

Merrick, H. Olver, H. L. Pemberton, J. Kenyon, G. Rossell, G. Smith, A. Simpkins, R. C. Trigger, G. Wartnaby, J. Wolstenholme, J. Wiggins, and Capt. Russell.

After the minutes of the last meeting had been read and signed, the CHAIRMAN mentioned that several telegrams apologising for non-attendance had been received by the Secretary, but one called more particularly for notice. It was from Professor Williams, stating that he had mistaken the day of the meeting. He felt sure they would all regret Professor Williams' absence, which would be a great disappointment to many of them.

The SECRETARY announced also that telegrams and letters of apology had in addition been received from:—Sir H. Simpson, Professor Walley, Messrs Kidd, Greaves, Faulkner, Leather, Briggs, Green, Parker, Carless, Blakeway, Merrick, Perrins, Freer, and Locke.

Election of New Members.

On the motion of Mr. COE, seconded by Mr. BARNES, Mr. James Henry Turner Kenyon, of Derby, was unanimously elected.

The SECRETARY moved and the CHAIRMAN seconded the election of Mr. Gould, of Redditch, which was agreed to.

Mr. OLVER proposed the election of Mr. A. Simpkin, of Market Harborough, Mr. MERRICK seconded, and the proposition was carried unanimously.

Mr. OLVER also proposed, and the SECRETARY seconded, that Mr. Watkins, of Lichfield, be made a member of the Association, and it was carried unanimously.

The SECRETARY here mentioned that the Association had never been so prosperous as regarded numbers as at the present day.

The New Rules.

The next business on the agenda was to receive the Report of the Committee appointed to revise the rules.

Capt. RUSSELL moved an alteration in Rule 10 as amended. He suggested that the meetings should commence at half-past one instead of two, and continue till four o'clock instead of five. Mr. COE seconded the motion. After hearing the opinions of several gentlemen on the subject, the Chairman put Capt. Russell's motion to the meeting, when it was negatived by fourteen votes to three. The revised rules were then submitted to the meeting *en bloc*, and carried unanimously.

The CHAIRMAN then called upon the Secretary to read the Report of the Committee appointed to examine the roarers operated upon by Professor Axe at Wolverhampton, on the 24th May last, which was as follows:—

Report of Committee appointed by the Midland Counties Veterinary Medical Association to examine and Report on three Horses operated on for Roaring, by the Intra-Laryngeal Operation, on May 24th, by Professor Axe.

The Committee met at Wolverhampton, September 20th, and proceeded to the Albrighton Hunt Kennels, where the three animals were kindly sent for their inspection. Owing to indisposition, Mr. A. Over, M.R.C.V.S., who was appointed on this Committee, was unable to be present, and his place was filled, at his request, by Mr. T. Chambers, M.R.C.V.S., of Dudley.

Report.

Your Committee beg to state that they carefully examined the three animals, which they had seen operated upon at Wolverhampton, on 24th day of May last, and report as follows:—

No. 1.—Brown Gelding, about eight years old, the property of the Masters of the Albrighton Hunt. This horse is still a very pronounced roarer, in

addition to which, since the operation, he suffers from a distressing cough. The cough is very frequent, in fact almost incessant, when either walking, trotting, or galloping. In addition to this there is a copious discharge from both nostrils. No alleviation whatever of the roaring has followed the operation.

No. 2.—Black Gelding, seven years old, still a very pronounced roarer. In this case also discharge from nostrils, which pours copiously when pulled up after a gallop, also same incessant cough as in previous case, and horse much distressed by his exertions in galloping.

No. 3.—Bay Mare, six years old, still a pronounced roarer. In this case also cough is present, and is frequent in all paces. Mare quite unequal to much physical exertion in golloping, and pulls up very distressed. Again we find copious discharge from nostrils, also when drinking, a large quantity of water is returned down the nostrils. This also occurs in horses Nos. 1 and 2.

Your Committee greatly regret to have to report that in none of these cases has any benefit followed as a result of the operation. On the contrary, you have untoward results in the frequent cough and the discharge from the nostrils. In the opinion of this Committee also the animals exhibit more distress under exertion than do roarers of about the same degree under ordinary circumstances.

Your Committee the more deeply regret to report these unsatisfactory results, because having seen the operations on these animals performed by the Professor, they can with great pleasure testify to the absolutely skilful manner in which they were carried out.

Your Committee beg to add that the thanks of this Association are due to the owners of the horses for the trouble they took in again placing them at our disposal, and sending them some miles for examination.

(Signed)
E. BEDDARD, M.R.C.V.S., Wolverhampton.
ROBT. C. TRIGGER, F.R.C.V.S., Newcastle, Staff.
R. H. CARTWRIGHT, M.R.C.V.S , Wolverhampton.
T. CHAMBERS, M.R.C.V.S., Dudley.
F. B. JONES, M.R.C.V.S., Leicester.

Mr. COE said he was present at the Albrighton Hunt Kennels when the horses in question were operated upon, and he was very much surprised to see that no benefit accrued from the operation.

The CHAIRMAN remarked that they were all disappointed at the result, which was as bad as it was possible to be. A few days ago he had a conversation with Mr. Boycott, the present owner of No. 3 mare, when the latter stated he intended to breed from her. He (the speaker) was very much surprised and disgusted to hear of him ever dreaming to breed from a roaring mare, but Mr. Boycott said that she was sound in her wind before she went to Ireland, eighteen months ago, and therefore he contended that her ailment could not be hereditary. He (the Chairman) thought the point worthy of discussion, as he for one should like to know the opinion of the meeting as to whether roaring was hereditary or not. He could only say that the mare had since last month somewhat improved, and the other day she was ridden by a man at their first meet.

Mr. CARTWRIGHT mentioned for the information of the meeting that the mare was bought as a four-year-old by Lord Wrottesley, and was hunted by him the following season. She afterwards went to Ireland, where she was taken ill with inflammation of the lungs, and came back a bad roarer.

Capt. RUSSELL observed that the report did not disappoint him in the least. He had previously stated that roaring and whistling were two different things.

In the case of roarers an operation upon the larynx was perfectly useless, but it might do a little good in the case of whistlers. He repeated that roaring and whistling were two separate and distinct effects, the one being produced from the larynx, the other being in the head. He had read that the Army declined to allow those operations to be performed.

The CHAIRMAN: I remember having read a similar statement, but I don't know whether it can be credited.

In answer to a question by Mr. Coe, Capt. RUSSELL said that in his opinion whistling was due to some paralysis of the larynx, but roaring, a distinctly separate effect, was caused by an affection of the velum palati.

Mr. MERRICK: Is it not often found that whistlers become roarers?

Capt. RUSSELL: Yes, undoubtedly.

Mr. MERRICK, proceeding, said he should not personally be disinclined to breed from the mare referred to, being of opinion that her ailment was not hereditary, having originated from inflammation of the lungs.

Mr. SMITH quoted an instance that had come under his knowledge. A mare —his own property—some six months ago caught cold, and inflammation of the lungs set in. She was bad for three weeks, and then she turned out to be the worst roarer he ever rode. He never rode her again till that very morning, when he galloped her over some bad country, and he could assure them that she was perfectly sound in her wind.

Capt. RUSSELL said his experience went to show that when a horse roared it was done with the expiration, whistling being due to the inspiration.

Mr. BLOUNT, senior, remarked that he had known cases of horses having sore throats, thereby affecting the mucous membrane, and they had turned roarers, but ultimately recovered. Had they suffered from paralysis of the larynx, they would have been roarers for ever.

Mr. JONES could not satisfy himself that roaring was hereditary. The celebrated thoroughbred Hereford, who was himself a roarer, got a wonderful lot of stock, and all the horses that had long necks were roarers, but the short-necked ones were not. Had roaring been hereditary, why should not the short-necked horses also have proved roarers? As regarded a horse recovering from roaring, he quite agreed with Mr. Blount that the mucous membrane was affected by strangles and sore throat, and a horse might be a roarer for several months and then recover, but if paralysis of a recurrent nerve set in, he could never get sound in his wind. In reply to a question, Mr. Jones said it was his opinion that whistling was produced when the horse was first taken with paralysis, and as the paralysis progressed, several structures, such as the aryteno-epiglottic folds and the velum palati, fell in, and that produced roaring. He remembered a case in which a cart mare became a marked roarer. She got better of it, but in about two years afterwards roaring came on worse than ever. All efforts to give relief proved futile, and they had to decide the question with a pole-axe. But he had a look at the larynx, and found it diseased, and it must have been so a long period, and that appeared to have gradually affected the mucous membrane.

The CHAIRMAN: And do you think she would have been safe to breed from?

Mr. JONES: Yes.

Mr. MERRICK drew attention to the fact that Prince Charlie, a bad roarer, was sent to America for stud purposes, and at first the Americans made a great outcry at the importation of roaring horses. He was now dead, and they regretted his death as much as they did the death of Lyddington, for his stock was sounder than that of any horse for many years. That being so, he concluded that it should be no more difficult to breed from dams than from sires that were roarers.

Mr. JONES related another interesting circumstance in dissecting the larynx

whilst living, in which he sought to disprove Capt. Russell's theory that roaring was done with the expiration and whistling with inspiration. The fact that they differed at all, he said, showed very clearly that they did not all know the physiology of the larynx.

Mr. BARNES observed that last month he examined two roarers—one a confirmed roarer. The latter, however, worked wonderfully well, but they were constantly afraid that it would be suffocatad. He should like to ask if any of them knew of roarers going for a long time without fatal results.

Mr. SMITH said he could mention a case in answer to Mr. Barnes. It was a horse he drove himself, and although it turned roarer it was a good worker, and could do fifteen miles an hour. He would do five or six miles at his top speed, and then if you didn't pull up he would squeal, and you would be in danger of a smash. He quite lost his head.

A VOICE: He lost his wind, I should think. (Laughter.)

The CHAIRMAN, reverting to the report, said that one of the roarers—number one—they had to destroy. One of the whips rode him and he was absolutely useless. Scott, the huntsman, sent the larynx to him, and he had a look at it, and suggested that it should be sent to Professor Axe, that he could judge whether or not they had truly and faithfully reported the case. They could, doubtless, get the larynx of the second horse for personal observation, if they desired it, for the animal was not worth much money.

The SECRETARY suggested that the Association should purchase the black horse and have the larynx dissected during the next meeting. It might even be killed just before the meeting and the larynx dissected in the room. They had sufficient funds for the purpose.

The CHAIRMAN.—I could get the horse.

This course having been resolved upon, the discussion was resumed.

Mr. OLVER said that some time ago he had brought to him one of the worst roarers he ever heard, and Captain Russell could bear him out in that statement. It lived two or three years after the time he spoke of, and on its death he made a *post-mortem* examination. They had previously had all sorts of theories as to what had caused the Roaring, but they all proved wrong. The larynx was perfectly healthy, but the lungs were in a condition he hardly knew how to describe. They had simply collapsed, and there were no air-cells. He knew the animal never had Pneumonia, but from some reason he could not explain, the air-cells had become gradually obliterated.

Mr. COE mentioned a singular case of Roaring. A horse had been out with the Queen's staghounds. The stag was captured and put into a loose box at a neighbouring hostelry. A valuable hunter was put in the same stable, and although it was previously sound, the next morning it was a Roarer. It was stated that the Roaring was caused by fright.

The CHAIRMAN remarked that if they were to talk till Doomsday, they would never agree as to the exact cause of Roaring.

Mr. TRIGGER, the Vice-Chairman, said he would like to make a few remarks upon the subject, having been present when the operation was performed. He thought the result failed to give any relief to the animals. It did seem that there was some slight evidence that one mare was able to undergo more exertion than when she was first seen, but he recollected noticing that the mare had severely blistered sides. He himself did not think that in her case the disease was located in the larynx at all. If she could undergo exertion at the present time, it was, he said, simply because she was in better health—it was not a result of the operation. She was, like the other horses operated upon, subject to coughing, therefore it was plain that she derived no benefit from the operation, but participated in its ill-results. The question he asked was, why did the operation fail to give any relief? Because, he said, they never attacked the seat of the disease at

all. They removed the paralysed structure—paralysed as the result of the disease—they failed to remove the cause of that paralysis. They got several untoward results, such as coughing and affection of the mucous membrane. They got a certain amount of irritation, but although they removed that obstacle they had never touched the seat of the disease, and therefore the animal was as bad a Roarer as ever, and its general condition was worse, inasmuch as they got several undesirable results from the operation. He did not agree with Captain Russell when he said that Roaring was made in expiration. His opinion was the exact opposite. With regard to Prince Charlie's stock not being Roarers, he pointed out that he had gone to a climate where Roaring was almost unknown. Prince Charlie was not an isolated case, for Roaring was unknown in drier climates. Referring to a question asked by Mr. Barnes, he (the speaker) thought there was no doubt that Roarers were very often serviceable horses, when worked slowly. Speaking on the report itself, he could only say that it was the unanimous opinion of the five surgeons constituting the Committee, and he could only regret that it was not more satisfactory.

The report was then submitted to the meeting, and unanimously adopted, and on the motion of Mr. Olver, a vote of thanks was accorded to those gentlemen forming the Committee, for the services they had rendered.

Tuberculosis and the Contagious Diseases (Animals) Act.

Mr. TRIGGER said that more than a year ago, a resolution was passed by their Association to the effect that the time had arrived when Tuberculosis should be included in the Contagious Diseases (Animals) Act, and that the inspection of abattoirs and dairies at present so imperfectly conducted in this country should be improved and transferred from police officers to qualified professional men. Unfortunately, on that occasion, the resolution was not brought under the notice of the proper authorities. He would, therefore, move that the resolution he had stated should be forwarded to the Council of the Royal College of Veterinary Surgeons, the Local Government Board, and the Chamber of Agriculture.

Mr. WIGGINS seconded the resolution.

Mr. MERRICK pointed out the difficulty that would be incurred in inspectors condemning beasts supposed to be suffering from Tuberculosis. It was hard to be absolutely certain in the matter. There was more danger to the human subject from the milk than from the flesh of such a beast. The Council in 1888 would not consent to bring it under the Act because they did not see their way to compensate slaughter, and he was afraid it would be difficult to persuade the authorities to bring it under the Act now.

Mr. OLVER remarked that he had always taken a great interest in the matter. He might say a word to a certain friend who seemed adverse to the opinion that Tuberculosis showed itself in pigs. He himself was rather surprised some eighteen months ago to learn that Tuberculosis was as common in swine as in cattle. He had taken the trouble to go round to pig killers, and he was surprised to find that a large number of the pigs slaughtered, to all appearances healthy, were more or less suffering from Tuberculosis. They all knew that it existed in horses, and they knew very well that it had been produced in animals from the human subject. He thought they were bound to pass that resolution, because it would be the means of stopping a number of wasters that were producing diseased milk for consumption by the people.

Mr. BLOUNT, Junior, said a case of Tuberculosis once came under his notice. A cow had Milk Fever and died. He made a *post-mortem* examination, and found she was suffering from Tuberculosis, the whole of her lungs being covered with tubercular matter. She seemed to be in a perfect state

of health, and had always done well. That fact would prove the difficulty to be experienced in determining whether an animal was suffering from Tuberculosis or not.

The resolution on being put to the meeting was carried unanimously.

A vote of thanks to the Chairman, proposed by Mr. Merrick and seconded by Mr. Smith, brought the meeting to a close.

The members subsequently dined together.

YORKSHIRE VETERINARY MEDICAL ASSOCIATION.

THE quarterly meeting of this society was held at the Queen's Hotel, Leeds, on the 8th November, the President, Mr. Lodge (Dewsbury), was in the chair, and the following veterinary surgeons were also present:—Messrs. A. W. Briggs, Halifax; Joseph S. Carter, Bradford; J. M. Axe, Doncaster; G. E. Bowman and A. W. Mason, Leeds; S. Chambers, Kirkheaton; Geo. W. Carter, Keighley; T. Fletcher, Sheffield; A. E. Hanson, Norwood Green; H. Snarry and George T. Pickering, York; M. Robinson, Barnsley; J. Clarkson, Garforth; J. Atcherley, Harrogate; J. E. Scriven, hon. treasurer, Tadcaster; and W. F. Greenhalgh, hon. secretary, Leeds.

Letters of apology for non-attendance were read from Messrs. Toope, Knaresborough; Bale, Otley; Deighton, Riccal; Cooper, Huddersfield; Danby, Driffield, and F. P. Carter, Bradford.

A Vote of Condolence.

Mr. J. S. CARTER moved a vote of condolence with the widow of the late Mr. E. C. Dray, of Wandsworth, Surrey, and who practised in Leeds for many years as a veterinary surgeon. He remarked that the deceased gentleman, in conjunction with Professor Williams, the late Jno. Cuthbert, and W. Broughton, of Leeds, and himself, inaugurated the society at whose quarterly meeting they had met that day. The deceased gentleman was one of whom that society might well be proud, as after leaving the immediate neighbourhood of Leeds, he still had the interests of the profession at heart, and had filled the office of President of the Royal College of Veterinary Surgeons, and for some years occupied the position of treasurer to that body. Mr. Dray attained the ripe age of eighty-three years, and he (Mr. Carter) saw him for the last time in April, when he complained about the state of his health, and feared he would not be able to meet many of his old friends again. He (Mr. Carter) had been acquainted with him for many years, and he had never known a more upright or genial member of the profession, or a gentleman who was more willing to give every assistance in his power to the younger members of the profession.

Mr. AXE, in seconding the motion, which was carried unanimously, paid a high tribute to the memory of the deceased.

On the minutes of the last meeting being submitted, Mr. BRIGGS said he would like to refer to the comments made by Professor Walley on the remarks he (Mr. Briggs) was reported in the journals to have made at their last meeting on the subject of Tuberculosis. What he (Mr. Briggs) had intended to say was, that badly drained and defectively ventilated mistals would, in his opinion, give rise to Tuberculosis, *when a predisposition existed.*

Mr. G. W. CARTER remarked that, in Professor Walley's criticism, remarks had been attributed to him (Mr. Carter) which were contrary to the reports which had appeared in the journals, and therefore it was unnecessary for him to reply.

The minutes were then confirmed, subject to the correction regarding Mr. Briggs' speech.

The HON. SECRETARY nominated as members of the Association, Mr. Jas.

Wooding, Shepley, and John Appleyard, Halifax, at the request of Mr. Cooper, Huddersfield.

Mr. T. B. Exley, Leeds, was elected a member of the Association, on the motion of the hon. sec., seconded by Mr. Carter.

The HON. SECRETARY stated that he had received a letter from Mr. W Awde, hon. sec. of the newly constituted South Durham and North Yorkshire Veterinary Medical Association, asking for a copy of the rules of the Yorkshire Veterinary Medical Association. The copies of their rules were exceedingly scarce; they had not been revised for many years, and he felt they would not be of much use to Mr. Awde, until the work of reconstruction was completed.

Fixed Meeting Dates.

The HON. SEC. read communications from Mr. H. Kidd, Hon. Sec. of the Royal Counties Veterinary Medical Association, asking the members of the Yorkshire Veterinary Medical Association to take into consideration the advisability of having fixed dates on which to hold the meetings of the various associations, owing to the meetings of different associations being held on the same day. He suggested that the Presidents and Hon. Secretaries of the various associations hold a conference to fix the various dates of meeting. He concluded as follows: "It is quite evident these associations are having a wonderful effect in raising the profession. It is my earnest desire that we should meet each other, and I have no doubt that the members of the various associations would also receive mutual benefit as the result of the conference."

Mr. FLETCHER thought it was a good suggestion to have fixed dates. There was a meeting of another association that day at Derby, which he certainly would have attended except for neglecting his own association.

Mr. J. CARTER proposed that in future the meetings of the association be held on the last Friday in the first month of every quarter.

Mr. FLETCHER, in seconding this, remarked that they would probably hear from the secretaries of the other associations as to whether the date they had chosen was agreeable to them.

Resolution carried.

Circulars to Local Authorities.

The Hon. Sec reported that the recommendations as drawn out by the association in reference to the appointment of empirics as meat inspectors, etc., had been forwarded to a large number of local authorities in Yorkshire, but he had not received many replies.

Mr. BRIGGS pointed out that the circular had been taken notice of at the various meetings. It was a question which was gradually coming to the front.

Mr. LODGE thought the circular had done good; in fact, perhaps as much good as anything they had done.

Case of Lymphangitis.

Mr. A. E. HANSON remarked that he would like to bring before the notice of the members a somewhat remarkable case which had occurred recently in his practice. On the 5th of October a mare was purchased at Wibsey fair, and worked for a time all right, but on the 25th of October he was called in to see her, and found her suffering from Lymphangitis in both hind legs, one leg being fixed to the ground, and the near hind leg was swollen from the stifle to the foot. She ate well, but was slightly feverish; the mouth hot, but the pulse normal. He administered a six-drachm dose of aloes, and gave her stimulants. For several days the near hind leg remained fixed and rigid, and on the Tuesday following he called in Mr. J. S. Carter, and they

examined her thoroughly, per rectum and otherwise, but could discover nothing to account for the symptoms. She continued in the same state until Friday, when she recovered the use of the near hind leg, and on Saturday could walk about. On Sunday he found that the off hind leg had become affected as the near hind had been, but her appetite continued good. On Tuesday night following she became affected in both hind legs, and fell to the ground. At eight o'clock at night, however, she jumped up, could walk about, and continued in a satisfactory state at the present time. In his opinion it was a case of embolism or partial paralysis, but he could not say which.

Mr. FLETCHER: How was the pulse?

Mr. HANSON: The pulse was normal, and her urine was not at all coffee-coloured; but within the last day or two it has become somewhat more coloured. I have applied extract of belladonna to her teeth, and it has seemed to be beneficial to her. I have applied hot fomentations, and rubbed the legs with embrocation. Both legs were swollen as in a case of Lymphangitis.

Mr. G. W. CARTER: Was there a line of demarcation between the swelling?

Mr. HANSON: No there was not; the swelling is there now, but not to as great an extent as it was last week.

Mr. G. W. CARTER thought it was an ordinary case of Lymphangitis, with pressure on the nerve supply. He had seen other cases almost on a par with Mr. Hanson's case.

Mr. HANSON: At first she seemed to be feverish, but after a good physicing she was quite cool again.

Mr. J. S. CARTER described his visit to the mare, and said he inquired if she had been down, but was informed she had not, and that she had been seized quite suddenly. Of course she might have been down, but there was nothing in the way of broken head-gear or anything of that sort to indicate it. He could find no lines of demarcation or anything analogous to it. He had had another case lately similar to this. There was great swelling on both hind legs and a discharge from the nose, but he could never detect any marks at all on the Schneiderian membrane or in the eye.

Mr. BRIGGS: Is there no alteration in the temperature?

Mr. CARTER: The legs felt hot.

Mr. HANSON: It looks strange that this animal after being affected in each hind leg in turn, should become paralysed in both.

Mr. BRIGGS: Has the swelling disappeared?

Mr. HANSON: The swelling is there still, but not to the same extent as formerly.

Mr. SNARRY: What started this case?

Mr. HANSON: Nothing, so far as I can learn. She was working on the Thursday, and on Friday she was in the state I have described.

Mr. SNARRY: I should think it must be by Lymphangitis causing nerve pressure from which the paralysis arose.

Mr. FLETCHER said he was of opinion that it was a case of embolism pressing upon the nerves which caused the paralysis, and why he thought so was because some seven or eight years ago he had a similar case, but only one hind leg was affected. On examining the rectum he could feel the embolism, and after some days it was removed and the animal became right again. The limb was fixed, but there was a certain amount of twitching. It was in slings about a week when it began to use the limb. The pulse was quick and full, and there was constitutional disturbance.

Mr. G. W. CARTER: Did it recur?

Mr. FLETCHER: No.

Mr. HANSON: I found the less the mare was exerted the better she was. There was less shivering in the member not affected. Both fore legs were unaffected.

A Calcareous Thymus Gland.

Mr. G. W. CARTER: I have a specimen to submit to this meeting. I have formulated a theory as to what it is from the position I took it from. I think it is a Calcareous Thymus Gland, and I took it from the mediastinum of a cart-horse, nine years old, that had fractured its suffraginis. Perhaps every two or three months, for the last eighteen months of his life, he was affected with a low bilious attack. I treated him with calomel and physic, and in about ten days he would be all right. I can't see any connection between a calcareous gland and an affection of the liver. I have found nothing like it in any published veterinary works, but I have shown it to various medical men, who tell me they have cases of calcareous glands in various parts of the body.

An Unusual Cause of Obstruction.

Mr. G. W. CARTER then proceeded to describe a very unusual cause of obstruction of the bowels in a mare, which resulted in the death of the animal. The subject was a brown carriage-mare, seven years old, which commenced being ill with what appeared to be an ordinary attack of colic. The usual remedies were administered, but the pain continued, though at no time was it very acute. Opening medicine was given, followed by doses of sedatives combined with linseed oil, and enemas were frequently exhibited. For five days the pain continued and no fæces were passed, the animal then dying from exhaustion. Upon making a *post-mortem* examination, the following condition of the intestines was found to exist. When the contents of the abdominal cavity were exposed to view, no structural alterations could be observed, neither were the various viscera altered in colour or position. There was no unusual amount of tympany of any of the bowels. Upon laying open the double colon throughout its entire length, the cause of the obstinate constipation was found to be a peculiar emphysematous condition of the bowel for about the last eighteen inches of its course, and immediately in front of the commencement of the floating colon, the inflated coat of the bowel being about six or seven inches in thickness, and thus completely blocking the passage and preventing any fæces from entering the single colon. Upon removing the affected portion it directly commenced to collapse until, upon the following day it was not more than two to three inches thick. The cellular tissue of the affected portion of the bowel presented the appearance of a number of bladders inflated with air, which upon being pricked with a pin immediately collapsed with a hissing noise caused by the escape of the contents. The mucous membrane covering the same portion of the colon was but very little heightened in colour, and presented upon its surface many of the same bladder-like cysts filled with air, but smaller in size than those of the cellular tissue. There was no other cause of obstruction to be found, and the contents of the bowels in front of the diseased portion were in a fluid condition. I should suggest that this abnormal condition might arise from an injury to the mucous membrane causing a wound by which the gases generated in the bowels might find an entrance into the cellular tissue.

Mr. FLETCHER said he had seen a good many affections of the bowels, but he had never seen one such as Mr. Carter had described, and he agreed it had probably arisen from the cause suggested by Mr. Carter.

Swine Fever.

Mr. FLETCHER asked if any of those present had read the communications in the journals referring to Swine Fever producing Fever in the human sub-

ject. He had been an Inspector for many years, but he had never seen anything of the sort.

Mr. G. W. CARTER thought the matter was worth very little notice, and Mr. AXE agreed with this.

An Interesting Point.

Mr. AXE: I should like to draw the attention of the members of this Association to what I consider to be an important and interesting case. Late in July or early in August last, a thoroughbred stallion colt, by Peppermint, belonging to Mr. Waterhouse, of Skellow, was being got ready for exhibition at the show of the Yorkshire Agricultural Society. The horse was being exercised by a man in a field, and being fresh he made a big jump, and began to bleed freely at the nostrils. The usual means for stopping the bleeding were used, and after the loss of a great quantity of blood, the flow was stopped. The result of the rupture was that the horse became completely blind in both eyes. I think this is an important thing in reference to the question of hereditary complaints. Where are we to draw the line? You surely would not call this an hereditary complaint. The horse himself has perfectly recovered, but he is as blind as a bat. The question is, how did the bleeding arise, and should such a horse, under such conditions, with no hereditary taint as to blindness, be debarred from taking one of the Queen's premiums?

Mr. BRIGGS: You do not think he struck anything?

Mr. AXE: No. I have no doubt the colt was living well and making blood fast. He gave a big jump, and a blood-vessel broke, and he bled like a pig.

Mr. G. W. CARTER: Have you any idea what vessel it was?

Mr. AXE: No.

Mr. SNARRY: I remember a case in which a colt was being broken in, and it reared and came back on its poll. It bled profusely down both nostrils until it nearly sank. The bleeding was stopped, but two days after it became totally blind in one eye, and was half blind in the other. My idea of that was that it was a partial fracture of the basilar process of the occipital bone.

Mr. AXE said the pupils of the eyes were bold and dilated.

Mr. BOWMAN: I should like to ask if it is the opinion that a horse suffering as has been described by Mr. Axe should be shown for a Queen's premium.

Mr. ATCHERLEY: I should say decidedly not.

Mr. BOWMAN: It is not proved that the disease is hereditary.

Mr. G. W. CARTER: That is the question.

Mr. AXE said he had traced the pedigree of the horse some way back and could find no trace of hereditary unsoundness of the eyes.

Mr. G. W. CARTER: You are taking it for granted it is the result of injury.

Mr. FLETCHER: I think after relating the case, Mr. Axe asked us if we considered the case one of unsoundness, in which the horse could not be used for stud purposes. I think there is very little doubt very few people would accept him as a sound horse, but the question is whether his stock would be affected. I should say it would not be.

The PRESIDENT: Do you think he is not fit for stud purposes?

Mr. FLETCHER: I should say he is fit, but perhaps he would not be accepted for the Queen's premium.

Mr. AXE: Well, Goggles, my own horse, was blind, but we never knew him to get a blind one.

The PRESIDENT: If the blindness is the result of an accident or injury I should not hesitate to put a valuable mare to the horse, but it must be proved that it resulted from an injury.

Mr. ATCHERLEY pointed out that it was impossible to prove to anyone blindness arose from injury.

Mr. G. W. CARTER: Can we convince ourselves? In this case described by Mr. Axe, I don't think that there is a shadow of a doubt that if the horse were put in for examination before the Royal Commission it would be rejected, and it would be impossible to prove that the blindness arose from accident, and therefore the Commission would be justified in rejecting him. What vessel could it be that would rupture and bleed down the nostrils, where no clot could interfere with the optic nerve?

Mr. ATCHERLEY mentioned a case in which a horse commenced bleeding from the nostrils, and he bled him in both jugular veins, and the bleeding stopped at once, and he was all right.

Mr. BOWMAN asked if the horse Mr. Axe had mentioned had been used at all.

Mr. AXE replied that the animal had covered several mares.

Financial.

The HON. TREASURER (Mr. Scriven) presented his annual financial statement, which showed the Society to be in a satisfactory condition, and it was unanimously adopted.

Mr. G. W. CARTER proposed that a statement be sent to all members of the association whose subscriptions were in arrear.

Mr. BOWMAN seconded this, and it was carried.

Election of Officers.

The HON. SECRETARY (Mr. Greenhalgh) explained that hitherto it had been the rule to elect the President by seniority of membership. The two gentlemen who came next on the list were Messrs. Hardy, of York, and R. L. Robertson, of Leeds. He had approached both these gentlemen on the matter, but they had declined to accept the office. Next in order of seniority came Mr. Briggs and Mr. Snarry. The latter gentleman, at present, could not see his way to fill the presidential chair, and therefore he proposed that Mr. Briggs be President of the Society for the ensuing year. He might say that Mr. Briggs had been a regular attendant at the meetings of the association and had taken a lively interest in the proceedings, and he believed he would add dignity to the chair and conduce to the advancement of their mutual benefit.

Mr. SNARRY seconded this, and it was carried unanimously.

Mr. BRIGGS briefly returned thanks.

Mr. Clarkson and Mr. Pickering were elected Vice-presidents in conjunction with the retiring President, the former on the motion of Mr. LODGE, seconded by Mr. SCRIVEN, and the latter on the proposition of Mr. AXE, seconded by Mr. BOWMAN.

On the motion of Mr. G. W. Carter, seconded by Mr. Axe, Mr. Scriven was re-elected hon. treasurer, and on the motion of the retiring president, seconded by Mr. Mason, Mr. Greenhalgh was re-elected hon. secretary.

Votes of Thanks.

Mr. BOWMAN proposed that the best thanks of the Association be given to Mr. Lodge for the very able manner in which he has discharged the duties of President during the past year. He said: It is with great pleasure I rise to propose this vote of thanks to our worthy retiring president. I am sure he has conducted our meetings in a most scientific and satisfactory manner, and that he has been most industrious and painstaking in promoting the advance of our profession. At these meetings he has fulfilled the promise made in his inaugural address that he would insist upon attention from members

present, and would not allow general conversation while a subject was being discussed, and, gentlemen, each and all of you will, I am sure, agree with me in giving him our hearty thanks.

Mr. AXE, in seconding this said Mr. Lodge had taken great interest in every debate, and whatever he had done he had done heartily and well.

Mr. FLETCHER said Mr. Lodge had kept them in order. He had prevented much of the desultory conversation which used to prevail, and which wasted such valuable time. He had discharged his duties thoroughly, and they ought to be very much obliged to him.

Mr. GRELNHALGH said he would like to bear testimony to the amount of hard work Mr. Lodge had gone through during his year of office. He could assure them he had had the interest of the Society very much at heart, and had been constantly planning and contriving to forward the welfare of the Association.

The vote of thanks having been put and carried with enthusiasm,

Mr. LODGE: I thank you heartily for the kind manner in which you have accorded a vote of thanks to me for any services I may have rendered to this Association. I have tried to do my best without fear or favour. If I have on any occasion been rather hard in calling any one to order, I hope I have given evidence that I have done it for the benefit of the Society. I believe during my year of office this Association has done good and valuable work, and that the members of the Association who have attended the meetings have derived benefit from the papers which have been read and the various discussions which have taken place. I shall always endeavour to support the authority of the chair, and shall continue to take as profound an interest in the affairs of the Association in the future as I have done in the past. In conclusion, I may say I have had great pleasure in working with the hon. treasurer and the hon. secretary, and the other officers.

Votes of thanks to the hon. secretary and hon. treasurer concluded the proceedings.

W. F. GREENHALGH, *Hon. Sec.*

ROYAL SCOTTISH VETERINARY SOCIETY.

(*Continued from page* 388)

On the invitation of the Chairman, Professor MCCALL, Glasgow, offered a few remarks. He said he was one of those who believed in inoculation, provided it was performed in a sound manner by use of genuine virus. He remembered in his college three years ago they had a cow, two yearling heifers, and one bull. These animals had never been in contact with any animals labouring under Pleuro-pneumonia, and they were sound. The cow was inoculated, and her tail was amputated after six weeks' cleavage. She was, while perfectly healthy, put into a byre where disease had been lodging, and remained in it for about nine months. During that time, though many animals had been removed, she was neither up nor down. The two heifers were inoculated, and it "took." Their tails were also docked. They remained together for over four months, and he sent them out in the following month to mix among the other stock on his farm. They, too, were neither up nor down. The bull never took the disease either. In his own mind he was not only satisfied that inoculation was a preventive, but he went further, and said that a perfectly sound animal after inoculation was not a source of contagion. Such had at least been his experience. If they wished to get rid of the disease completely, however, it could only be by slaughter, though they might reduce it into far narrower dimensions by adopting inoculation under certain conditions. Ten out of thirty animals in a byre would withstand the disease. Supposing they did inoculate them they

were always saving one-third of these animals, and that was of considerable value to the country. If they adopted inoculation immediately on detecting the disease in a byre they would thus have one-third, or possibly two-thirds of the animals remaining so healthy, and they would not know that they had contracted the disease. In that way a large sum of money might be saved. It was, however, hardly safe to operate in that way unless animals that were operated upon went direct from the premises to the slaughter-house. The man was not born who could tell in every case whether an animal had had Pleuro-pneumonia or not. If they could tell with certainty animals that had diseased lungs it would be all right. If animals, as hitherto practised, were allowed to be removed from the premises after apparently recovering, they would never get rid of the disease, even after inoculation, by any such methods. Inoculation appeared to be only an auxiliary measure, but if they wished to get rid of the disease they must ultimately rely upon slaughter.

Mr. CAMPBELL said Professor McCall had told them that he believed in inoculation if they had a guarantee that every animal was sound. He endorsed every word of that. They had been told not many months ago by one who had practised inoculation, that it was impossible for an animal to slip his observation when going round to examine a stock of cows, because he had a thermometer, and that whenever it registered a quarter of a degree over the normal temperature he at once concluded it must be an infected animal, which must be ordered out to be killed. To his great surprise a few days ago in the National Congress it was said that the thermometer was of no use at all. He had seen many cases of lung disease where the greater part of the lung was totally diseased, and still the normal temperature registered was 102°. This showed that in other diseases of an inflammatory nature there was ordinary fever. The animal might live possibly for a year after a severe attack of Pleuro-pneumonia when the fever had abated. He held that a lung or a portion of it never could perfectly recover, and that there was a serious and covered danger in inoculation.

Professor MCFADYEAN took it for granted they were all familiar with the fact that there were few questions that had been more disputed, the remedies of inoculation or slaughter for Pleuro-pneumonia. It would be a long time before that discussion terminated. He was strongly of opinion that the discussion would not be very much prolonged if facts were cited more than they were. That had been brought to his mind by the remarks of Bailie Cranston at the meeting held in the hall that day, in which he complained of a prospective increase of the rates, consequent upon the slaughter regulations. They all entertained a lively hope that slaughter was not to be a perpetual measure. The sum required to compensate for the slaughter for Pleuro-pneumonia in the large cities might be estimated in places where the system had been in force for six years. In France it had been in operation since 1882. There they slaughtered those animals that showed symptoms of the disease, and then inoculated all the others. The result was that the sum paid in compensation had risen steadily ever since. It amounted to £6,000 a year. This was a fair comparison ; it was obviously favourable to the method of slaughtering, as at present in force in this country. The French system held out absolutely no hope that they would ever have any less to pay than at present. Referring to the observations of Professor McCall, he said that every man who was informed on the subject, and who was not obstinate, would agree with what he had said. He was favourable to inoculation only when it was practised upon uncontaminated stocks, or only on condition that the animals in contact with the disease should only leave the byre for the purpose of slaughter. It was merely a system of disguised slaughter, but it was not what would be adopted

in this country. At the present time, Edinburgh and Glasgow had a small burden compared with Aberdeen and Ayrshire. It appeared to him that if they were to take upon themselves the responsibility of urging the local authorities to set aside the Slaughter Order, they would have to be prepared to explain how it was that, in other countries in Europe, until slaughtering had been carried out no hope had existed of their being able to deal with Pleuro-pneumonia, and also how it was that in countries in which the system of slaughter had been in force for four or five years, they had got quit of it. He instanced Norway and Sweden, Holland, Switzerland, Baden, Luxemburg, adding that not only had these countries got rid of Pleuro-pneumonia, but that in some of them it had been as rampant as it was in this country. This was a complete argument to those who with little foresight urged that stamping out the malady would not be profitable. For his part he thought if it was not done now, they would have to resort to it at no very distant day again. It was foolish and almost culpable on the part of the authorities to put in force any measure, without taking steps to ensure that it was properly carried out. He was not sure that such steps had been taken in this country. The rule in Holland was that when a district was declared infected, the Government immediately nominated a certain number of inspectors; they took a census of the whole stock in that district, and then they were able to account for the death or removal of any animal in that district until the outbreak was stifled. If we had such a system adopted in this country, and could ensure that animals which died from the disease were not put out of the way, and evasion practised, they would very shortly have the last case of Pleuro-pneumonia.

Mr. PENDER, Lockerbie, submitted what he termed a veterinary sanitary scheme for the prevention of contagious diseases in cattle. The measures he was about to propose had never yet been adopted, but he thought they were necessary to cope with contagious and hereditary diseases. His scheme had for its object that every animal should have pure water, pure air, wholesome food, and rational and humane treatment, and also that only healthy animals be used for breeding purposes. Further, in the event of an outbreak of disease, to enable the sanitary officials promptly to ascertain the fact and to take steps to overcome it.

He suggested, (*a*) the constitution of veterinary sanitary boards with compulsory powers; (*b*) that every owner brand all cattle belonging to him, with such marks as shall be directed, indicating the nation, county, parish, and owner, and to register the same in a stock book; (*c*) that in said stock book he register all births, pedigrees, diseases, and deaths, or the delivery of any animals out of his hands alive; (*d*) that owners ascertain the nature of any disease appearing in any animal, from a M.R.C.V.S., who shall enter particulars in the stock book, or of the death of the animal; (*e*) that owners provide sufficient supply of wholesome water, breathing space, ventilation, and other sanitary measures as may be necessary; (*f*) that owners shall cause the teats of cows to be washed previous and after the said cows being milked, and that milkers wash their hands previous to milking each cow; (*g*) that market places be supplied with sufficient water, food, and shelter; (*h*) that all animals landed in the country from abroad be branded with such marks as shall indicate the country and port from whence they come; (*i*) that a board of specialists be appointed whose duty shall be to ascertain the nature of water or food which may be suspected of causing disease in animals, and report professionally on the state of health of animals.

Professor MCCALL, in proposing a vote of thanks to Professor Walley for opening the discussion, remarked that they appeared to be all of the mind that slaughtering should be continued. He thought they should all make a strong representation that it should be conducted under Government. Each

local authority was allowed to define for itself what it considered contact; some said one thing and some another, and the disease was allowed to gain in power. He was certain that until the Government took the matter in hand, and adopted some measures of the kind, they would not see the reforms which it was necessary should be brought about.

The vote of thanks was unanimously awarded, and the meeting terminated.

THE DINNER.

The members of the Society and a few friends dined in the Douglas Hotel in the evening. Mr. CAMPBELL, Veterinary Surgeon, Kirkcudbright, Vice-President of the Society, presided, and gave the usual loyal and patriotic toasts.

Mr. PHILLIPS, of the Army Veterinary Department, in responding to the toast of "The Army, Navy, and Reserve Forces," remarked that he thought the time had come when Government aid should be given to the veterinary profession, especially in prosecuting scientific research.

Dr. AITKEN proposed the toast of "The Royal College of Veterinary Surgeons," remarking upon the great progress of the veterinary profession, which embraced an ever-increasing class of intelligent men, who had received a good education in their youth; and he thought the time had come when the veterinary students should have a written as well as an oral examination.

Professor McCALL, in acknowledging the toast, agreed with Dr. Aitken that it would be for the advantage of all concerned if there was a written as well as an oral examination.

The CHAIRMAN proposed "The Veterinary Schools," and Principal WALLEY, in replying, said that the proposal to have a written as well as an oral examination would come before the next meeting of the Council of the Royal College of Veterinary Surgeons. He said he would also do his best to press forward their claim to receive State aid, for it was a disgrace to the country that their institutions should not receive one sixpence from the Government.

The other toasts were "The Royal Scottish Veterinary Society," and "The Chairman," by Mr. PENDER, and "The Press, and Mr. Macdonald, of the *Farming World*," by Dr. MACFARLANE.

W. D. FAIRBAIRN, *Hon. Sec.*

ROYAL VETERINARY COLLEGE MEDICAL ASSOCIATION.

THE Annual General Meeting of this Association was held in the theatre of the College on the 23rd of October, 1889.

In addition to a large attendance of student-members, there were present the President (Prof. Penberthy), Secretary (Prof. Macqueen), Treasurer (Prof. Axe), Prof. Shave, and Messrs. Wilder and Byrne.

The annual report stated that sixteen papers had been read during the past session, and several very interesting *post-mortem* specimens introduced; also that Prof. Axe had delivered a very lucid and interesting lecture upon the operation known as Laryngo-tracheotomy, and that Prof. Brown had given a very pleasant and highly-instructive demonstration of the various micro-organisms by means of the oxy-hydrogen lantern.

The following silver medals were awarded:—

For best examination on all subjects of the curriculum (excepting Chemistry and Botany)	Mr. E. D. Johnson.
For the best essay read and defended before a meeting of the members, subject: "Protective Inoculation"	Mr. M. W. Gatward.

For the second ditto, subject: "Bacteria"	Mr. A. W. Stainton.
For best essay on "Tuberculosis, and its Prevention;" competition open to all student-members	Mr. F. E. Place.
For best essay on "Adulteration of Food Stuffs;" competition limited to members of Class A.	Mr. J. Toms.

The retiring President having delivered his address, thanked the members for the courtesy extended to him during his year of office, and congratulated them on the average attendance at the meetings being higher than in any previous year.

The election of officers for the ensuing session then took place and resulted as follows :—

President	Professor Penberthy.
Secretary	Professor Macqueen.
Treasurer	Professor Axe.
Vice-presidents	Members of the Teaching Staff of the College ex-officio.

Messrs. F. T. Oatway.	Messrs. J. R. Cox.
„ W. Pritchard.	„ R. Withers.
„ F. W. Wragg.	„ S. J. Rayment.
„ F. L. Somerset.	„ D. Pugh.
„ J. Rowe.	„ F. Hill.
„ A. Perkins.	„ F. Place.

Assistant Secretary .. .. Mr. F. E. Place.

Votes of thanks to the retiring officers for their services during the past year terminated the proceedings.

J. Macqueen, *Secretary.*
F. E. Place, *Assistant Secretary.*

THE BALTIMORE UNIVERSITY, U.S.A., SCHOOL OF VETERINARY SCIENCE.

The introductory lecture at the opening of the new school was delivered by Professor Ward, F.R.C.V.S., on October 1st, 1889, in the Lecture Theatre.

Professor Pierce B. Wilson, M.D.,* one of the Directors, introduced Professor Ward in the name of the Directors of the University in eulogistic terms, stating that Dr. Ward had been selected as the President of the veterinary faculty because his European had been substantiated by his American reputation as a leading veterinary authority, and as a citizen of the United States. His associates were known in connection with the Bureau of Animal Industry as good men; the other professors belonged to the medical faculty, of which he, the speaker, was one.

Professor Ward said—

Gentlemen,—As the president of the veterinary faculty, it is my duty as well as privilege to address you on this occasion. I will not follow the old-style custom by saying I would that it was otherwise, that the task had fallen in abler hands, etc., etc.; my powers of speech are inadequate to do, etc. No, but I will say that I shall do my best to make you understand what lies before you as students, and give you as concisely as possible an outline of the course of study you must and will have to go through, to obtain a fair knowledge of the art and science of veterinary medicine and surgery.

* Professor Pierce B. Wilson was a pupil under Professor Liebig.

As this is the opening day of a new branch of study in the liberal arts and sciences, I feel bound to preface my remarks to you by giving a short concise history of this branch of medicine, its importance to and connection with agriculture, with human medicine and public health, and its present condition or *status* in this country. Ancient history tells us that, in what was termed the classic ages of Greece and Rome, veterinary medicine was recognised as holding the closest relationship to agriculture. Plagues are referred to with serious comment. Xenophon, Virgil, Ovid, Homer, Hippocrates can vouch for such troubles, and Homer was the first sanitary inspector or health commissioner, for we are informed that he ordered the Grecian camp to be swept out clean, and that the refuse should be cast into the sea, with the object of staying the pestilence.

To go back further, Holy Writ gives serious references to murrains among herds and flocks.

Again, one of the early Christian poets, Severus, in his "De Mortibus Bovem," gives a very plaintive account of the cattle plague.

Possibly some of you here have seen Hogarth's "Enraged Physician," which was a very fair caricature of the horse-doctor and cow-leech of his time.

To approach near the eighteenth century, we find that Buffon, the great naturalist of France, urged doctors to study animal diseases, but his advice was slowly grasped.

It appears that M. Bourgelat, an advocate at Lyons, was the first man to develop a study of veterinary medicine, for he induced the Government to establish a veterinary school at Lyons in 1761.

France, therefore, led the way in the study of animal diseases in our modern times, and other European countries soon realised its importance and value, and established veterinary schools, but old England was the last to see it, and then, had it not been taken in hand by a few old farmers, years might have elapsed ere England had a school; however, these farmers started the Veterinary College at St. Pancras, London, in 1791. The usefulness of the teaching was soon recognised, not only by farmers and horse-owners, but by the English Government, for graduates received appointments in the army as commissioned officers, and the status of army veterinary surgeons has under the present Commander-in-chief risen to a proud position, the duties performed by the department in times of war and peace clearly demonstrating the value of this branch of the service, and to such extent that the Queen has conferred the Companionship of the Bath on several veterinary officers, and in civil life conferred the order of knighthood on a rural practitioner at Windsor.

I merely mention this as encouragement to aspiring veterinarians in this country of our own, for I am sure that, at no distant date, the value of a thoroughly organised army veterinary department will be truly demonstrated and formed, and the appointments made worth seeking after by good and educated men.

The profession is quite young in this country, having an existence of about a quarter of a century—the first school being, I think, that of Montreal, followed by one in Toronto, then New York, which has two now, then one in Harvard University, recently one in Pennsylvania University, and one in Chicago, making five schools in the United States proper.

The Bureau of Animal Industry has every reason to thank these schools for the service they have rendered it, by placing their graduates at its disposal for duty as Inspectors in carrying into effect the Animals' Contagious Disease Acts, for without these gentlemen to act as Inspectors, the Government would have found itself in sad fix; therefore here we have a very fair instance of the value of veterinary schools to our commonwealth. Perhaps

I should remark that the Governments of European countries established the schools, except England, as mentioned; there it was left, as it is and has been here, to develop under the usual laws of development from small beginnings by the exertions of private individuals; then the graduates rally round. Thus it was that the veterinary profession was raised up in England, and thus it is and has been here; however, it can no longer be considered *infra dig.* to belong to our profession; the position of men of culture has been attained by those gentlemen who by their deportment have commanded it. For surely as the barber-surgeon of old gave up, so also will the horse-doctor and cow-leech give place to the educated veterinarian.

Human medicine and animal medicine are so closely allied that a line of demarcation is difficult to trace; both are rich in researches of immense value, so that the closer the two professions are together, the better it must be for mutual advancement. In Europe, this intimacy has long since been established; still comparative pathological chairs have not been established, whilst comparative anatomy has been taught for years.

The leading medical men, past and present, took and take great interest in the veterinary schools and their advancement, and it seems this interest has spread over here.

If there is any country needing the services of truly educated men (scientifically and practically) to look after the live stock interests, it is this country. Look at the live stock emporium of the world, "Chicago"! you can count animals by billions, and their value by tens of billions. All this immense wealth is entrusted to duly-qualified veterinarians; for, remember, "quacks" are not eligible for Government appointments, "political diplomas don't count." Look again at Kentucky, what value in horse-flesh here! Look at our new fields in the American Kennel Clubs—"canine pathology"! why, the other day, I had a stud dog brought for treatment, valued at a *thousand dollars.* The field is wide, truly wide; the true labourers, however, are few.

This brings me to my words to you, the students or freshmen. Let me tell you that a modern veterinarian requires a fair English education, a knowledge of Latin and Greek, to realise the meaning of medical terms ever confronting him, and an acquaintance with German and French is valuable, for our best literature comes in those languages.

A knowledge of geology, agriculture, and botany are needed, to acquire a knowledge of the soils, poisonous plants, diseases of plants, and value of various grasses. Chemistry, organic and inorganic, quantitative and qualitative, must be grasped by you before a knowledge of Materia Medica and Therapeutics can be mastered, to become physicians; and besides curing disease, you will be in request as surgeons; every minor and major operation must be performed by the educated veterinarian; here a knowledge of anatomy will serve you, but remember you must not only learn *how* to operate, but *when* also, and when to *decline.* Therefore you must pay attention to your studies in Pathological Surgery.

To become pathologists you must apply yourselves to a study of physiology, a knowledge of functions. Histology teaches the minute structure of all organised bodies, and microscopy yields also a knowledge of the factors of disease termed bacteriology, and these studies mastered, you will become true pathologists.

Diseases of the eye and ear are very important and must engage your attention.

Hygiene also is necessary, for although we are rarely called in till our patients are real sick, we are often besought to advise how to keep the balance in health.

Forensic medicine is another branch of your study, but I see the Hon. R. Stockett Mathews is present he will tell you what that means, and

psychology also, which is down on your programme, as well as the principles of shoeing.

Now I have given you a fair outline of your work for three terms, a mental bill of fare which I hope will satisfy you; however, should any of you need more, you can have it *post graduate* at the "Johns Hopkins" in the next block.

I must remind you that every year is marked by progress, and that you must be found equal to the demand, or you will not succeed; you must love the profession you have chosen, take pleasure in your work, pride in doing the large and the small duties imposed on you, and in doing so honestly to work with a will and determination; remember the eyes of the world are on you and see your honest efforts, and it will assuredly reward you. In the battle of life you will find yourself engaged not only in battle against disease, but ignorance, empiricism, and prejudice will be in array against you in your labours in the cause of science. Let me beg you will bear in mind that "The shield of science will cover and protect you."

It has been truly said, "The clouds of ignorance may darken your course, but these will as certainly disperse before advancing knowledge as do the mists which enshroud the mountain-top before the rising sun."

In conclusion, allow me to assure you that, although the veterinary profession does not hold out any extraordinary honours in this country as it does in Europe, such as the election of the illustrious veterinarian, Henri de Bouley, to the Presidentship of the Academy of Sciences at Paris, you may gain many sincere and true patrons, who will stand by you unto the end of your professional life, and when your time comes to shake off this mortal coil you will close your eyes satisfied that your earthly pilgrimage has not been void or blank in good works and usefulness.

The address was received with applause.

The Hon. R. STOCKETT MATHEWS, one of the leading counsel at the Maryland bar, well known as one of the leaders in veterinary jurisprudence, among veterinarians, quacks, and horse-dealers especially, was called to the platform. He said it was a pleasure for him to live to see the day when veterinary medicine was recognised as a science in Baltimore, and educated men practising in it. He pictured quacks in court thirty years ago down to a very recent date, and explained how he had at all times denounced these low charlatans, many of whom had the barefaced effrontery to swear on oath they were M.R.C.V.S. of London, when he, the hon. gentleman, knew from reading Percivall's "Anatomy and Hippopathology," that such an ignorant wretch could never have seen the outside of the College even.

Mr. Mathews in a most eloquent and graphic manner pleaded for man's noble friend and servant, the horse, and man's true companion, the dog. Referring to psychology, he said the intelligence of these two creatures was so marked, and history tells us of remarkable instincts possessed, that a philosopher was obliged to reason on the subject. Forensic medicine should be studied, for in court the professional man who knew his science had the advantage, and his evidence went on the side of truth and justice, thus, such men are honoured and esteemed. He told the students not to let the hard names bother them; they were only Greek terms having a simple English meaning. He advised them to throw up all idleness, and going in for study in real earnest they would come out good men. Half measures would not do it, full time must be put in. Mr. Mathews was listened to with marked attention and most heartily applauded as he resumed his seat, thanking Professor Ward for the lecture he had delivered on behalf of the company.

The lecture theatre was nearly filled; several other educational bodies having their opening lecture at the same time, caused a few absentees, but in addition to the Directors, Faculty, and students, th re was a good sprinkling

of gentlemen interested in live stock. Captain J. D. Hill, of the Norfolk line, the well-known breeder of imported thorough-bred horses, was there along with the Hon. R. S. Mathews. Mr. E. Kearney, of the Monumental Stables, Messrs. Bye, Biedler, Thomas, Mullen, and others.

THE FIFTH INTERNATIONAL VETERINARY CONGRESS, HELD AT PARIS.

THIS Congress was opened at Paris on September 2nd, at the rooms of the Geographical Society, Boulevard St. Germain.

Dr. CHAUVEAU, President of the Organisation Committee, welcomed the numerous gathering, and particularly thanked those from beyond France for responding to the invitation of their French colleagues.

Professor NOCARD, General Secretary of the Committee, furnished details as to the origin of these Congresses and the work of the Committee, which in the present instance gave the following results: 635 veterinary surgeons had sent in their names, and of these 178 were foreigners, of which 48 were Belgians, 46 Swiss, 27 Spaniards, 8 English, 7 Italians, 7 Roumanians, 6 Dutch, 5 Russians, 4 Danes, 3 Austrians or Hungarians, 3 Americans, 3 Egyptians, 2 Luxemburgers, 2 Portuguese, 2 Japanese, 2 Germans, 1 Alsatian, 1 Swede, and 1 Norwegian.* He also mentioned the official delegations from Governments, municipalities, and the learned societies of foreign countries, and of French agricultural and veterinary societies; and specially alluded to the Minister of Agriculture, on the proposal of M. Tisserand, having given the Congress a grant of 3,000 francs (£120).

The PRESIDENT informed the meeting of the regulations prepared by the Committee, the fifteen rules of which were read and adopted; and in conformity with rule 3, he proposed the following as honorary members of the Congress: Dr. Willems, Hasselt; Dr. Hime, Bradford; Teisserenc de Bort, Vice-President of the Senate, and President of the Epizoöty Committee; and the following members of this Committee: Senator Jobard, Bernard-Lavergne, Councillor-of-State Becquet, Professor Brouardel, Professor Proust, Senator Leon Renault, Leblond, Poirat-Dubal, and Professor Verneuil.

The proposal was adopted with acclamation.

M. DECROIX proposed to add to this list of honorary members a venerable *confrère*, probably the oldest veterinary surgeon in the world, M. Renaudin, of Ville Evrard, who was now in his 105th year.

This proposal was also adopted with prolonged acclamation.

In the name of the Organising Committee, M. NOCARD proposed the following as Honorary Presidents: M. Pasteur, whose imperishable works have so powerfully contributed to the progress of veterinary medicine; Professor Röll, of Vienna, whose advanced age and health prevented him attending the Congress; M. Tisserand, the eminent administrator who had taken such a large share in elaborating the French law on sanitary police.

Professor PERRONCITO, of Turin, believed that he was the interpreter of all the members of the Congress in desiring that MM. Chauveau and Nocard, whose zeal and activity had assured the organisation and success of the Congress, should retain their posts of President and General Secretary. This was adopted with acclamation.

The Congress then nominated the following as—

* Only a portion of these foreigners attended the Congress, and there were only three from England.

Vice-Presidents:

Professor Degive, Brussels.
M. Jacops, Terremonde, Belgium.
Professor Berdez, Berne, Switzerland.
Colonel Potterat, Berne, Switzerland.
Professor Bang, Copenhagen.
Professor Perroncito, Turin, Italy.
Professor Thomassen, Utrecht, Holland.
Professor Semmer, Dorpat, Russia.
Dr. Fleming, London.
Professor Liautard, New York.
Professor Lopez Martinez, Madrid.
M. Fischer, Luxemburg.

Secretaries:

Professor Cadiot, Alfort.
M. Cagny, Senlis.
M. Leclainche, Alfort.
M. Pellerin, Alfort.
M. Jolly, Bellac.
M. Lucet, Courtenay.
M. Degois, Avallon.
M. Even, Sta. Catalina, Argentine Rep.
M. Roger, Roubaix.
M. Giubert, Chalons-sur-Marne.

Archivist.

M. Moulé, Paris.

The PRESIDENT thanked the assembly for the honour conferred upon him, and promised to give all his attention to directing the labours of the Congress in a good direction.

It was resolved that the questions should be discussed in the order in which they stood, and that the discussion of each should not extend beyond one sitting, so as to have all discussed within the time of the meeting.

The meetings were arranged for 8 a.m. every morning, and the afternoons were to be free, except on that day, the afternoon, of which was to be devoted to the subject of Tuberculosis.

Afternoon Meeting.

The President in the chair. Vice-Presidents, Degive and Perroncito.

The subject for discussion was the report of M. Arloing on "Tuberculosis Considered from the Special Points of View of Sanitary Police and Alimentary Hygiene."

M. ARLOING dealt in detail with the first part of his report, the purport of his remarks being to the effect that the basis of the sanitary police of Tuberculosis is slaughter of the affected animals, but this cannot be effected without compensating the owner. But before adopting this course, it was necessary to know what we were about to engage in, and Arloing appealed to the members of the Congress, and especially to the foreign ones present, to furnish information as to the prevalence of the disease.

PEUCH considered that the most certain way to recognise cases of bovine Tuberculosis and stamping out the disease, was to again include it amongst the redhibitory vices.

VAN HERTSEN gave the statistics of the Brussels abattoir for the first quarter of 1889. The percentage of tuberculous animals was—

1·2	per 1,000 for	oxen	(9 in 7,219)
1·9	„ „	bulls	(8 in 4,126)
19·9	„ „	cows	(46 in 2,313)
0·14	„ „	calves	(2 in 14,690)

Or 4·61 per 1,000 for adult bovines.

PERRONCITO supported the conclusions in the report.

THOMASSEN gave the following statistics from Amsterdam:—

Of 13,207 bovines, 268 were tuberculous, or 2 per cent.
Of 15,827 pigs, 63 were tuberculous, or 0·4 per cent.

At Utrecht, where there is not an abattoir, the percentage of cases observed was only 0·24 per cent. (8 in 3,250 bovines). In Saxony, according to Siedamgrotzky, the general proportion is 2 per cent.; but in the towns where slaughter-house inspection is compulsory the percentage is higher—16·6 at Frankenberg, 17·0 at Penig, 19·9 at Döbeln, 22·4 at Zittau. Tuberculosis is also more frequently observed in calves.

ARDERIUS BAUJOL stated that in Spain there are no statistics of the disease, but its contagiousness is generally believed in. Where there are abattoirs the veterinary surgeons return the number affected as 4 or 5 per 1,000. He supported the conclusions of the report.

EVEN said that in the Argentine Republic Tuberculosis was most frequent among the improved breeds recently imported. With them the proportion would be 10 to 15 per cent., as against 0.5 per cent. of the indigenous cattle.

LIAUTARD remarked that the disease made fearful ravages in the United States of America; it might be affirmed that 25 to 50 per cent. were affected, and they were often animals of very great value.

BANG stated that in Copenhagen the general statistics for last year gave a proportion of 6 per cent., though it was 16 per cent. for cows. The number of calves affected is small.

ROSSIGNOL inquired whether there was any inspection in the United States, and if human Tuberculosis was frequent.

LIAUTARD replied that there was inspection only in some towns, and total seizure was not practised. Every year there died of Phthisis from 500,000 to 600,000 people.

LAQUERRIERE affirmed that the malady has become very rare in the cattle-sheds in Paris. Its diagnosis is difficult, and even after death it is not rare to confound bacillary Tuberculosis with lesions which are only in appearance common with those of that disease.

LEFEVRE was of opinion that the abattoir statistics are below the reality. In certain regions tuberculous cows are collected by army contractors. This is an evil.

VAN HERTZEN thought that troops were less exposed to danger than was believed, as they only ate meat which had been boiled for a long time.

BAYRON mentioned that at the Montauban abattoir the proportion was 6 per 1,000.

POLLET remarked that in the North of France Tuberculosis is frequent among cattle and people.

SEMMER announced that the disease was unknown among the indigenous cattle of Southern Russia, but it was very frequent among those of Northern Russia, which were imported and kept in sheds; sometimes as many as 50 per cent. were affected. There is no law against the consumption of tuberculous flesh.

CAGNY confirmed the statement of M. Lefèvre—if diseased cattle were sent to the abattoirs they would be seized.

VILLAIN said that in the Paris abattoirs the percentage was from 5 to 6 per cent.

VINCENT reported that at Bucharest abattoir the proportion of tuberculous animals, which was only 2 per cent. at one time, rose to 30 per cent. when a small compensation was not given to the owners. The disease affects cattle of the same breed as those of Southern Russia.

BERDEZ thought that the abattoir statistics were too low. Those of Lydtin and Siedamgrotzky gave 3 and 4½ per cent. as the number of live diseased cattle. The Swiss veterinary surgeons estimated that 5 per cent. of the cows kept in sheds were tuberculous. According to medical men, the proportion of tuberculous people in towns varied from 12 to 25 per cent.

ROBINSON has adopted at Greenock, since 1874, the principle of total seizure. At first he seized from five to ten diseased animals per week, but at present he scarcely saw one in fifteen days; they are sent to be killed elsewhere.

ARLOING summed up the discussion. Every one recognised the danger and the necessity of meeting it, and this being so, should slaughter or sequestration be recommended?

CHAUVEAU pointed out that the discussion showed that the frequency of the disease varied much, according to the region, and that in voting they should adopt a principle, leaving to each country the mode of applying it. He therefore proposed to the Congress the adoption of the following proposition:—

"*In every country, animal Tuberculosis should be included among the contagious diseases which are the subject of sanitary laws.*"

This proposition was unanimously adopted.

LEBLANC remarked that the present French law did not give good results; it was necessary to perfect the diagnosis, generalise inspection of slaughter-houses, and compensate owners.

ARLOING then rapidly dealt with the second part of his report, treating of *alimentary hygiene*. He alluded to the experiments which proved the dangers attending the use of the milk and flesh of tuberculous animals, and concluded with insisting upon the necessity for interdicting the consumption of the flesh of every tuberculous animal, no matter in what stage of the disease it might be.

NOCARD contested the signification of the experiments, so far as the flesh is concerned. There has not been a good experiment proving that the ingestion of the flesh, destitute of *tubercular products*, may give rise to Tuberculosis. We cannot conclude from the results of injection into the peritoneum of the guinea-pig as to the danger of ingestion by man. To destroy such a great quantity of good flesh is an economic crime. If it is desired to avert all danger, even theoretical, the meat should be thoroughly salted, and when it is to be consumed it ought to be submitted to prolonged cooking; this would reassure the most timid. As to the milk every one was agreed.

HEU remarked that it was solely due to defective organisation that the law did not yield good results.

BAILLET affirmed that total seizure can only be practicable when the owners are compensated and the inspection of flesh is generalised.

BUTEL supported the views of Baillet, and mentioned the results obtained in France by the inoculation or ingestion of the blood, milk, and muscular juice of tuberculous animals. He energetically insisted upon total seizure.

DEGIVE refuted the arguments of Nocard. The intra-muscular lymphatic glands are as dangerous for man as for animals; and with regard to salting, so far from the flesh requiring complete cooking, it rather tempted people to consume it raw.

STUBBE'S experiments had yielded one positive result in four. He was an energetic partisan of total seizure.

DECROIX was not convinced. He continued to eat flesh and drink milk without taking any special precautions.

PERRONCITO was desirous that great quantities of good flesh should be saved from destruction; if salting would not suffice, why not have recourse to coction? The duty of the hygienist is completed when he can give assurance of the innocuousness of the food.

WEBER supported that view.

VAN HERTSEN had been fighting for a long time against Tuberculosis in all its forms, but hitherto without success. He had tried coction; this would be efficacious, but who would eat such food? The poor? Never!

THOMASSEN pointed out that the experiments made at Amsterdam proved that salting did not destroy tubercular virulence.

ARLOING did not think it necessary to reply, as the meeting appeared to have made up its mind; and he therefore asked that the conclusions given in his report should be put to the vote.

With the exception of four votes, the assembly adopted conclusion *a*, thus formulated: "*There is cause to eliminate from human and animal consumption the flesh of tubercular creatures, mammals and birds, no matter what the degree of Tuberculosis may be, nor yet the apparent qualities of the flesh.*"

The amendment of Perroncito, tending to permit the use of the flesh after complete coction, was not adopted.

The Congress then successively adopted propositions *b*, *e*, *f*, and *g* of Arloing's report.*

With regard to conclusion *d*, the Congress only accepted it in principle: "*Owners of cattle and pigs should receive compensation.*"

The PRESIDENT was gratified with the result of this sitting, as it accorded with the views of the Congress on Tuberculosis, the promoter of which was M. Butel.

NOCARD announced that the members of the Congress were invited to visit the Pasteur Institute the following Sunday; in the absence of M. Pasteur M. Roux would do the honours.

ROYAL AGRICULTURAL SOCIETY.

AT the Monthly Council Meeting held on November 6th, Sir JOHN THOROLD (Chairman) presented the usual monthly report of Professor Brown, and the quarterly report of the Royal Veterinary College, which were ordered to be published with the proceedings of Council.

The Committee had discussed at some length the continued prevalence in the country of Pleuro-pneumonia, and had decided to recommend that the following resolution be adopted by the Council and forwarded to the Board of Agriculture:—

"That the Government should take action in regard to Pleuro-pneumonia, and that they should apply the necessary measures for stamping out the disease at the cost of the Imperial Exchequer."

The Committee had also considered the present unsatisfactory nature of the precautions taken against Swine Fever, and decided to recommend the adoption of a second resolution as follows:—

"That this Council beg to call the attention of the Board of Agriculture to the continued spreading of Swine Fever, and to the want of uniformity in the regulations which are issued by the various local authorities for the purpose of checking the disease."

Copies had been laid upon the table of a Report, received from the Board of Agriculture, by the Chief Travelling Inspector of the Privy Council, on the subject of the transit of cattle from Ireland to Great Britain, and containing remarks on the suggestions which were made by the conference of representatives of the three national Agricultural Societies held on the 28th and 29th of March last. The following resolution in regard to Tuberculosis had been received from the Council of the Royal College of Veterinary Surgeons:—

* b. *That the utilisation of the hides and horns of tubercular cattle may be allowed after they have been disinfected, and the use of the suet also if necessary.*

e. *The milk of tubercular cows should not be allowed for human food.*

f. *Dairies kept in or about large towns should be properly inspected.*

g. *Everything possible should be done to induce consumers to boil milk the source of supply of which is not known.*

"That in the opinion of this Council Tuberculosis in animals should be dealt with as a contagious disease, in so far at least as actually affected animals, or animals suspected of being affected with the disease, are concerned."

The Committee recommended the appointment of Mr. J. Dawson Roberts, of Aberystwith, as Provincial Veterinary Surgeon for the county of Cardigan, and that a horse-shoeing competition be held in connection with the Plymouth Show, in two classes, viz., hunters and agricultural horses, the competition to be limited to the district in which the show is held, *i.e.*, District D (Berkshire, Cornwall, Devonshire, Dorsetshire, Hampshire, Kent, Somersetshire, Surrey, Sussex, and Wiltshire).

Sir JOHN THOROLD then gave notice that at the next meeting of Council the Committee would move for the renewal of their annual grant of £500, of which sum £200 to be granted to the Royal Veterinary College.

On the motion for the adoption of the Committee's Report, Mr. BOWEN-JONES said that it would have been more consonant with the feelings of those who had taken some interest in the question of Pleuro-pneumonia if a more decided policy had been laid down by the Committee in their report. Recommendations were given which to his mind were not sufficiently explicit with regard to that disease. He understood that the Committee desired the transference of the administration of the Contagious Diseases (Animals) Act with regard to slaughter for Pleuro-pneumonia from the local authorities to the central authority. He endorsed this opinion himself fully, but he should like to see it expressed instead of being left to be understood, and he should be glad if the Chairman of the Committee would accept an amplification of the resolution in that sense. He thought that if the resolution referred definitely to slaughter under Imperial control, it would then express exactly the opinion of those who believed that the only method of getting rid of Pleuro-pneumonia was by slaughter and by the administration of the Slaughter Act being placed in the hands of the central authority, instead of in those of the local authorities. As they were fully cognisant, it was in consequence of the inefficient administration of the Act by the local authorities that Pleuro-pneumonia had not been stamped out of the country.

Sir JACOB WILSON gladly seconded the proposal of Mr. Bowen-Jones, who was merely asking for what had already been granted by the Council at a previous meeting, and which was thoroughly in accordance with the recommendations of the Government Departmental Committee on Pleuro-pneumonia.

Mr. DENT desired, as he did this time last year, to call the attention of the Council to the slaughter of animals affected with Pleuro-pneumonia. He was aware that he took an exceedingly unpopular view. He had held this view for a long time, he still held it, and he supposed he always should. The opinion appeared to be gaining ground all over the country that the way to get rid of the disease was probably to slaughter everything, or as a member of his own County Council had said, "You must slaughter all the animals in the country to keep any alive." There was a letter in yesterday's *Times* pointing out the extravagant expenditure that had taken place in a great many counties. The writer, quoting from the last annual taxation return, gave for the three years ended 1886-7 an average expenditure of £85,118 in carrying out the Contagious Diseases (Animals) Acts. He was not sure whether that figure applied to the whole of Great Britain, or only to England. He believed that since the Slaughter Order had come into operation that expenditure had been doubled. He was sure it was so as regards the West Riding of Yorkshire. When he brought this matter forward last year, Professor Brown had told him that there had been a decided decrease in the number of diseased animals in the West Riding. Instead of any decrease there was an increase in the number of animals affected, and an increase in the number of animals

slaughtered both affected and in contact. The figures he had for the West Riding of Yorkshire from March 10th, 1888, at which period the Slaughter Order came into operation, were as follows:—Ninety-four infected animals slaughtered, loss £900; 616 healthy animals in contact slaughtered, loss £4,361 4s. 9d. He believed that in the majority of cases the animals were healthy at the time of slaughter. There was not merely the effect upon the rates, but there was the very serious loss and damage to the persons interested. The outbreaks in his district were amongst small owners and dairy proprietors, whose animals could not be replaced at the compensation valuation, nor their milk trade replaced, and who were therefore at very serious disadvantage and loss. They must remember that this matter was no longer in the hands of the landlords and magistrates; many of the members in his County Council were representatives of the pitmen, who did not look upon the matter as they did. They would find that they had a very different class of bodies to deal with. This would not affect ordinary agricultural counties, but in a great manufacturing county like Yorkshire, where there were four or five authorities, there was great difficulty in getting them to act under a proposed central authority, the compensation being paid out of the local rates. He saw there the President of the new Board of Agriculture, and he begged to congratulate him upon that office, for which he believed there was no one more fitted. He hoped that before Mr. Chaplin gave any definite decision on this point he would look very carefully into the matter. He thought the Act had been passed for the benefit of veterinary surgeons more than anything else, seeing the money which it placed in their pockets. He did not wish to say anything against the veterinary surgeons, who, as a rule, were men of honour and of good education, but the Act gave them every inducement to declare disease. In every outbreak notice must be given to the police, who must give notice to their superintendent, who in turn must call in a veterinary surgeon. They had therefore to pay both for the police and for the veterinary surgeons. It was no use the county authority carrying out the Slaughter Order unless the borough authority did so too. He did hope that the President of the Board of Agriculture would look very carefully into the whole administration of this Act. They (in Yorkshire) thought that the Slaughter Order as regarded animals that had been merely in contact should be revoked. It was found in many cases, on post-mortem examination, that the animals condemned by the veterinary surgeons of the Privy Council were perfectly healthy at the time of slaughter.

Sir JOHN THOROLD said Mr. Bowen-Jones had appealed to him as Chairman of the Veterinary Committee, as to whether he would accept an amendment to the Committee's resolution. The resolution had been discussed at length at the Committee yesterday, and it was felt that it was better, in any decision they might adopt, not to hamper the decision of the Government, with whom the entire responsibility rested.

Lord EGERTON OF TATTON said that the Committee did not wish to fetter the action of the new Board of Agriculture either in regard to Pleuro-pneumonia or Swine Fever, but to call attention to the state of things that existed, and to leave the Board of Agriculture to find the remedy. In Cheshire they took a diffrrent view to that which Mr. Dent took in regard to the West Riding of Yorkshire. They always acted promptly, and if the local authorities did not act promptly, then they got into considerable expense for the great number of animals which they had to slaughter. The Chairman of the Veterinary Committee in his own County Council was a tenant-farmer, and as far as his (Lord Egerton's) county was concerned, no change had occurred in consequence of matters being now dealt with by an elective body instead of by the magistrates. They should be only too glad if some central authority could carry out promptly and uniformly those orders which were believed

to be necessary. Promptitude in action and uniformity amongst the different local authorities were absolutely necessary to success in this matter.

Sir JACOB WILSON said that the Council were very considerably indebted to Mr. Dent for the lucid manner in which he had put and explained the other side of the question, which had sometimes been kept in the dark. Before his right hon. friend on his right (Mr. Chaplin) took action, that other side of the question should be most carefully weighed, but he would further say that he had listened with great interest to Mr. Dent's objections. He heard them with satisfaction because the arguments used by Mr. Dent were the strongest arguments in favour of the course proposed by the Committee. It was in view of the want of uniformity amongst the various local authorities that the present state of things ought to be put a stop to. The time had come when the country ought to rise on all sides, whether they were consumers, tenant-farmers, or landlords, or whatever position of life they occupied, and try to expel that scourge, which was an imported scourge, and which it was proved had been expelled from foreign countries by means of slaughtering where every other experiment had been tried without success. He hoped the Council would accept Mr. Bowen-Jones's suggestion, and that it would go with the fullest possible force to the Government of the day.

Sir NIGEL KINGSCOTE thought it would be better to leave the Government to take their own measures. He seconded this resolution in yesterday's Committee, and, though he felt very much indebted to Mr. Dent, yet he could not agree that his view of the question was the correct one. He felt certain that, as long as this disease was allowed to wander about the country by the inefficient measures of the local authorities and by prompt action not being taken, it would remain unchecked.

After some further discussion, the resolution as amended by Mr. Bowen-Jones was put to the meeting, and declared carried in the following terms:—

"That the Government should take action in regard to Pleuro-pneumonia, and that they should apply the necessary measures for stamping out the disease by slaughter under Imperial control, and at the cost of the Imperial exchequer."

Mr. DENT said that he wished to record his vote against a resolution which pledged them to the principle of slaughter, and asked Mr. Chaplin, as President of the Board of Agriculture, whether it would be possible for a return to be made of the number of outbreaks of Pleuro-pneumonia, the number of diseased cattle, the number of diseased cattle slaughtered, and the number of healthy cattle slaughtered since the Order came into operation.

Mr. CHAPLIN replied that he could not speak positively at the moment, but he had not the slightest doubt that it could be done, and he promised to give the matter his consideration.

Report on the Prevalence of Pleuro-pneumonia, Anthrax, and Swine Fever.

Pleuro-pneumonia.—Between July 20th and October 26th, a period of fourteen weeks, 148 fresh outbreaks of this disease were reported in Great Britain—sixty in England, and eighty-eight in Scotland. The counties in England in which outbreaks occurred during this period were Chester, Essex, Herts, Kent, Lancaster, Leicester, London, Middlesex, Norfolk, Northampton, Suffolk, Surrey, Sussex (East), and York (W.R.). In Scotland outbreaks have been reported in Aberdeen, Ayr, Edinburgh, Fife, Forfar, Inverness Kincardine, Lanark, Linlithgow, Perth, Renfrew, Ross, and Stirling. The total number of cattle attacked in the fourteen weeks was 526, of which 162 were in England and 364 in Scotland. In addition to the above, 2,085 healthy cattle which had been exposed to infection were slaughtered; 798 of

these were in England, and 1,287 in Scotland. In Ireland during the same period twenty-one outbreaks of Pleuro-pneumonia were reported. Thirty-three cattle were attacked, and 188 healthy cattle which had been exposed to infection were slaughtered.

Anthrax.—Forty-five outbreaks of Anthrax were reported to have occurred in Great Britain during the fourteen weeks. Thirty-nine of the outbreaks were in England, and fifty-nine animals were attacked. In Scotland only six outbreaks were reported, and nine animals were attacked. The cattle which were referred to in the last report as having been inoculated with cultivated virus of Anthrax to protect them from the natural disease have remained in good health.

Swine Fever.—In Great Britain, 1,364 outbreaks of this disease were reported during the fourteen weeks; 7,144 swine were attacked, 3,506 diseased pigs were killed, 2,957 died, 679 recovered, and 371 remained alive when the return was made up. This is a decrease on the returns for the preceding three months. A similar decrease has been noted in Swine Fever about this season for the past seven or eight years.

Quarterly Report of the Royal Veterinary College.

Experimental investigations on the diseases of Swine Fever, Blackleg in young cattle, and Tuberculosis in various animals, including poultry, and also on the development of the lung worm, were carried on during the last quarter, and some inquiries were made for members of the Society in regard to outbreaks of disease among farm animals. Cases of Actinomycosis, Tuberculosis, and Broncho-pneumonia in cattle were received into the infirmary.

In regard to Swine Fever, it is to be remarked that the experiments which have been made with the various organisms found in the diseased organs have not been followed by any positive results. For example:—a portion of the spleen of a diseased pig will cause Swine Fever in a healthy pig; while the micro-organisms which are cultivated from a similar portion of spleen have been introduced into the system of healthy swine without causing any illness. This is contrary to what was expected, and further experiments will have to be made in the same direction. It is obvious that until the organism which causes Swine Fever has been isolated, there is no possibility of obtaining a modified virus for the purpose of protective inoculation.

Investigations in reference to protective inoculation for Blackleg (Symptomatic Anthrax) were attended with contradictory results. The virus prepared by Messrs. Arloing, Carnevon, and Thomas was used as directed, but test inoculations with active virus, and also with dried juice of muscle from an animal dead of the disease, were followed by development of Blackleg in some of the protected calves, while others which were not protected by previous inoculation, were unarmed by inoculation with dried and fresh muscle juice. These experiments will be more fully referred to in the Annual Report.

Tuberculosis.—Recently public attention has been much excited on the subject of the danger of infection from eating flesh of tuberculous cattle, or drinking the milk, and it is specially to be noticed that the demands which have been made for legislative protection have been limited to cattle. Scientists are, however, well aware that swine and sheep are liable to infection, and there is no doubt of the remarkable susceptibility of poultry to the disease. In a large number of cases, the livers of fowls have been found to contain the characteristic tubercle bacilli in large number, and it has come to be considered that tubercle is limited to that organ in poultry. A specimen of a fowl which was suspected to have died of Tubercle was sent to the College for examination, and a few tuberculous spots were found in the

liver; but on further examination in the Bacteriological Laboratory of King's College nearly all the organs of the body were found to be affected, and the lungs were much worse than any other parts. This fact is extremely significant, as the lungs, from their protected position in the chest, are never removed, as other organs, before the fowl is cooked, and further it is the case that the lungs are generally under-cooked, and in this state they are eaten as a delicate morsel. It would appear, then, that the danger to public health from tuberculous meat is at least as decided in regard to diseased fowls as to tuberculous cattle, sheep, and swine.

Since the last quarterly report was laid before the Council, further inquiries have been made with regard to the development of the *lung-worm* of cattle and sheep, and it may be said that some advance has been made in the knowledge of the life-history of the parasite. Earth-worms from districts in which parasitic lung disease appears every autumn, or earlier if the season is wet, were found to be free from embryos during the dry hot period of the summer. As soon as the disease reappeared among calves and lambs after a considerable rainfall, the earth-worms again became infected, and the presumption is that they expel the embryos after they have advanced to a certain state of development, probably in the early part of the spring. The embryos remain dormant during the dry season, but on the occurrence of rain, become active, and in this state are taken up by grazing animals.

Investigations are being conducted with the view of isolating the organism of Pleuro-pneumonia of cattle. It has been claimed by several investigators that the microbe has been discovered. Mr. J. Poels, Dr. W. Nolens, of Rotterdam, and M. Arloing, of Lyons, are among the claimants. M. Pasteur carried on the investigation for some time, but abandoned it, presumably on account of the difficulty of defining any one of the many organisms which are constantly entering the lungs as the disease-producing microbe. The investigation is not, therefore, a very hopeful one, but there is always the chance that of a number of inquirers one may succeed in isolating the organism.

The College Infirmary continues to be well supplied with cases of disease in cattle, sheep, and swine, to the manifest advantage of the students.

(Signed) G. T. Brown, *Principal.*

FELLOWSHIP EXAMINATION OF THE ROYAL COLLEGE OF VETERINARY SURGEONS.

An examination for the Fellowship Degree took place in October, when two members were successful in passing, viz., R. W. Burke, Army Veterinary Department, and T. C. Toop, Knaresborough.

The examiners were Professors Brown and Duguid, and Dr. Fleming. The following were the questions.

General Pathology and Veterinary Medicine.

1. What conditions are necessary to establish the fact that a Disease is contagious?

2. Describe the Symptoms and Post-mortem Appearances in Swine Fever.

3. What circumstances are favourable to spreading of Contagious Diseases?

4. What are the Distinctive Symptoms of Glanders, and what tests can be applied to prove the Nature of the Disease in doubtful cases?

5. What is the Nature of "Husk" in Calves and Lambs, and what changes are seen in the Lungs in fatal cases?

6. In what parts of the country, and under what conditions, is Husk most prevalent?

Pathology.

1. Describe Tetanus with regard to (1) its Nature and Causation, and (2) its Anatomical Characteristics, and, when the disease terminates fatally, the Cause or Causes of Death.

2. Describe Pleurisy in the Horse with regard to Causation and Anatomical Characters.

Epizoötiology.

1. What is meant by the term Influenza? How does it usually manifest itself (1) as to Geographical Extension, and what are the Forms it assumes?

2. What are the measures necessary for the Suppression of Bovine Tuberculosis, viewing it as a contagious disease? and what steps should be taken to safeguard the Public Health in regard to the Flesh and Milk of affected animals?

3. How would you distinguish between Bovine Contagious Pleuro-pneumonia and Bovine Tuberculosis in the living animal?

(One question in each subject must be answered.)

Comparative Anatomy and Physiology.

1. Give the Distinctive Characters of the Animal and Vegetable Kingdoms.

2. Give an account of the Modifications of the Heart in the different classes of Vertebrata.

3. Describe the Characteristic Features of the Dentition of the Horse, Ox, Sheep, and Pig.

4. Give the number of Pulsations per minute in the Horse, Ox, and Dog, and state how the Pulse Wave is produced in the Artery.

5. Describe the Structure of the Mucous Membrane of the Small Intestine, and state how the absorption of Chyle takes place from its surface.

6. What is the Specific Gravity of the Urine of the Horse? Name its Normal Constituents and the Sources from which they are derived.

Therapeutics.

1. State the circumstances under which Purgative Medicines are indicated in the Treatment of Disease, and also those in which their administration may be followed by injurious effects.

2. What are the Physiological Actions of Digitalis and Arsenious Acid? State under what circumstances they may be used in Veterinary Medicine.

NOTE.—*Four of the six questions on Comparative Anatomy and Physiology, and at least one of the two on Therapeutics, to be answered.*

Army Veterinary Department.

Gazette, November 19th.

Veterinary-Surgeon, First Class, W. Burt, has been placed on temporary half-pay, on account of ill-health.

Veterinary Surgeon, First Class, W. R. Walker, has embarked for a tour of service in India, and Veterinary Surgeons Lardner and Newsom are under orders to embark for that country.

Inspecting Veterinary Surgeon Oliphant has arrived from India, and is posted for duty at Aldershot.

VOLUNTEER ARTILLERY.—The appointment of Veterinary Surgeons to Volunteer Batteries of Position, has been under consideration with regard to the capitation grants for officers. The officers of Batteries are allowed, under ordinary circumstances, a certain grant of money which goes to keep up the equipment, etc., but a special capitation grant is given in addition, for proficiency. Medical officers receive this grant when they have passed an examination in ambulance organization; but with regard to Veterinary Surgeons this allowance could not be claimed hitherto, as they have no organization of this kind to master.

It has now been decided, on the recommendation of the Principal Veterinary Surgeon, that to earn the Special Capitation Grant, Veterinary Surgeons who have not served as such in the Regular Army, must be Fellows of the Royal College of Veterinary Surgeons. Those who have served in the Regular Forces can receive the special grant without obtaining the Fellowship.

YEOMANRY CAVALRY.—Appointment of Acting Veterinary Surgeons. It has been at times complained of in this Journal, that in some Yeomanry Cavalry Corps, Veterinary Surgeons were only privates, though acting professionally. Representations having been made to the Horse Guards with the view of removing this indignity, the following General Order has been issued: "An acting Veterinary Surgeon will be allowed to every regiment which is not entitled by its establishment to a Veterinary Surgeon; but such acting Veterinary Surgeon will only receive the pay of a Yeoman, and will be in lieu of one of the number of non-commissioned officers and men authorised by the establishment." This Acting Veterinary Surgeon has, of course, the rank, and wears the uniform, of an officer.

It may be mentioned that efforts are being made to assimilate the Veterinary Surgeons in the Auxiliary Forces with those of the Regular Army, so that they may be included under the same organization, wear the same uniform (silver instead of gold lace), and obtain promotion by length of service.

Obituary.

MUCH sincere regret on the part of all, and of sorrow with many in the profession, will be experienced at the announcement of the death of Edward Coleman Dray, F.R.C.V.S., Honorary Treasurer of the Royal College of Veterinary Surgeons, which melancholy event occurred on October 27th, at his residence, Spencer Villas, West Hill Road, Wandsworth, at the advanced age of eighty years. Though evidently in ill-health for some time, our lamented friend held out nearly to the last in transacting his official duties and taking his usual exercise, being only for a short time confined to his bed. It is scarcely possible to do justice, in a brief notice like this, to the good qualities of this most estimable colleague; but the few remarks we venture to offer may be acceptable to our readers as a tribute to the memory of one whose career was that of an honest and honourable man. Mr. Dray was born in 1809, at New Hall, Dymchurch, Kent, and was educated at Hythe; when fourteen years of age he was articled to his brother-in-law, a barrister in London. For two years he lived in chambers in Lincoln's Inn, but upon the death of his relative he gave up the law, and his godfather, the late Professor Coleman, induced him to enter the Royal Veterinary College, where he studied, and in due course passed a successful examination in 1836. He then went as an assistant to a practitioner in Sheffield, where he remained for some time; but an opportunity occurring for establishing an independent practice in Leeds, he transferred himself there. By dint of his sterling qualities he earned the confidence and esteem of those who sought his

advice and services, and rendered himself very popular as a citizen of that important town until 1871. His cultivated tastes, and especially his predilection for music, made him much sought after, and for many years he was the moving spirit of the Leeds Musical Society. Gifted with a good voice and great taste, he was something more than an amateur vocalist; while his sound judgment and readiness to promote musical teaching gained him the acquaintance and friendship of several of the musical celebrities of those days. Among these was the well-known composer and basso, Mr. Weiss, who dedicated his beautiful and perennial song, the "Village Blacksmith," to our deceased friend. In spending his few leisure hours in this manner, Mr. Dray did not neglect his extra-professional duties. Working in harmony with his brother practitioners, he was an energetic agent in establishing the Yorkshire Veterinary Society, of which he was the first President for two successive years. In 1871 he retired from the profession, so far as actual practice was concerned, and leaving Leeds, he settled in the locality in which he died. For twenty-eight years—from 1861 to 1889—he was continuously connected with the Council of the Royal College, and during the long time he filled the office of President, Vice-President, member of Council, and Treasurer. In all these positions he rendered excellent service, and especially while custodian of the funds of the Corporation, of which he was scrupulously careful. In everything pertaining to the welfare of animal medicine and its votaries he took a deep interest, and to the end of his life this was evident. He was one of the connecting links, of which few now remain, that bound the early to the later days of veterinary science in this country, and he was in every respect a worthy representative of what our real professional pioneers were. As such, and as one also who never got behind the times, he will, it may be predicted, be long remembered for his loyalty to the Royal College of Veterinary Surgeons.

Another of our colleagues, only a year junior to Mr. Dray in the profession, though five years younger, has died under somewhat melancholy circumstances. Mr. Thomas Hurford, M.R.C.V.S., late of the Army Veterinary Department, died suddenly in the Royal Artillery mess-room, on November 6th. He was born in 1814, graduated in 1837, and entered the Army as Acting Veterinary Surgeon in 1838. In 1839 he was gazetted to the then 15th Light Dragoons (now 15th Hussars), and was transferred to the 12th Light Dragoons (now 12th Lancers) early in 1854. He was promoted to Veterinary Surgeon 1st Class in 1859, and made Staff Veterinary Surgeon in the same year. In 1871 he was placed on retired pay. Embarking for India in 1839 with the 15th Dragoons, he remained with that regiment until it left India, when he joined the 12th Lancers, and accompanied it from that country to the Crimea, to which it went by the overland route through Egypt—a march which, until that year, had never been accomplished by British cavalry. After the Crimean War he returned to India. Towards the end of the war in China, he was sent out to that country as Principal Veterinary Surgeon, but arrived too late to share in the field operations. He was much devoted to field sports, and since retirement took a considerable share in their maintenance in the Woolwich garrison. In recognition of his services in this direction, the Royal Artillery presented him with a testimonial a few years ago.

Veterinary Surgeon T. Pottinger, M.R.C.V.S., Army Veterinary Department, died at Bombay on November 2nd. Graduating in 1881, he became demonstrator of anatomy at the Royal Veterinary College, and in 1883 he joined the Army. After the usual probationary period at Aldershot, he embarked for a tour of service in India, acting for some time as a teacher at the Bombay Veterinary School.

Owen Thomas, M.R.C.V.S., who graduated in 1863, died at Biggleswade, Bedfordshire, on November 12th.

The deaths have also been reported of H. Newsome, M.R.C.V.S., Suffolk, a graduate of 1865; and A. R. Simpson, M.R.C.V.S., Dublin, who graduated in 1875.

Notes and News.

A Remarkable Jump of a Horse.—While driving in Central Park, New York, recently, Mr. Meuller, of Dickel's Riding Academy, New York, had an astonishing experience, and discovered a new jumper. His horse, a young brown mare, became frightened, and, after two unsuccessful attempts to check her, succeeded in getting beyond control, and dashed wildly towards the Eighth Avenue exit. Realising his danger, Mr. Meuller headed the mare towards the stone wall that separates the park from Fifty-ninth Street, between Seventh and Eighth Avenues. On approaching the wall with increased velocity the mare, instead of coming to a stop, "took off," and cleared the ditch and wall, landing on the sidewalk on Fifty-ninth Street, the hind feet on the balustrade and the dog-cart in a perpendicular position against the wall, the measurement of which is 7 feet 11 inches. She "took off" from a bank 10 inches high, making the length of the leap, from point of "taking off" to highest, 11 feet, a remarkable jump indeed for a novice, especially in a dog-cart. The animal bids fair to become a competitor for the championship. Mr. Meuller's only injury was a slight cut on the chin—a remarkable escape. The spectators described it as a very thrilling experience to witness. —*Field, Turf, and Farm.*

Foot-and-Mouth Disease in Germany.—Foot-and-Mouth Disease has again been discovered at two of the principal cattle-markets of Germany, *i.e.*, Berlin and Leipsig. The disease, it is said, has been brought over from East Prussia by pigs. The authorities at Berlin are about to erect isolated buildings in that city, where diseased or suspicious cattle will be immediately dealt with.

Dogs as Despatch Carriers.—In the Dutch East Indies dogs, suitably trained, have been employed to carry telegraph messages from Keta-Kadiji to Pakan-Kroeng Tyœt, when from any cause the telegraph wire was not available. The messages were concealed with their collars, and were conveyed the six kilometres (about $3\frac{3}{4}$ miles) in ten minutes, being about 656 yards per minute.

Texas Fever.—What was called Red Water, but which, we believe, was Texas Fever, caused the death of 119 head of cattle out of 770 on board the ship *Oxenholme*, which arrived at Liverpool from Boston lately.

Acetic Acid as an Antiseptic.—Dr. F. Englemann, in *Centr. f. Gyn.*, claims that acetic acid possesses equally as good antiseptic qualities as carbolic acid; in fact, that it is to be preferred, as it is completely harmless, even if used in concentrated solutions, and that it is a valuable hæmostatic, an advantageous addition, particularly in obstetrics. Another important property is its ease of transition into the tissues, which, according to Englemann's experiments, is far greater than that of all the other antiseptics. Of bichloride of mercury it is well known that it forms an insoluble combination with albumen, and can therefore act only on the surface, while acetic acid extends into the deeper tissues with ease. Acetic acid also affects the metal of the instruments, but not so severely as the bichloride of mercury; the forceps, for instance, may be placed for a quarter of an hour in an irrigator filled with a 3 per cent. solution of acetic acid without being injured. A pleasant effect of acetic acid is that it softens and lubricates the

skin. Englemann generally used a 3 per cent. solution. At times he has made use of a 5 per cent. solution, which would easily cause a painful burning where sores were present, so that he only used the latter strength in septic cases, as the 3 per cent. solution proved to be a satisfactory antiseptic for general purposes.

SWINE PLAGUE.—The so-called "Hog-cholera" is raging with fatal effect in Wilson County, and many farmers have lost their entire stock of hogs. There are other portions of Southern Kansas in which the loss of hogs is great from the same disease.

PROTECTIVE INOCULATION AGAINST HYDROPHOBIA.—In the year ending October 31st, 1,810 patients bitten by dogs were treated at the Pasteur Institute in Paris. There were thirteen deaths.

WOOD-MEAL AS FORAGE.—"Wood-meal" flour is now used in Austria as food for horses and cattle. The meal is said to have a greater nutritive value than straw, and where the latter is scarce the wood-meal takes its place.

FOOT-AND-MOUTH DISEASE IN GERMANY.—So extensive is the spread of Foot-and-mouth Disease amongst the cattle in Germany that the chief milk establishments in Berlin are now forced—in accordance with the provisions of the law—to take the precautionary measure of boiling their milk before selling it to the public.

SWINE PLAGUE IN AMERICA.—From Baltimore it is reported that the "Hog Cholera in Kent County is rapidly spreading. About 200 hogs have already been lost, and more will surely follow. Farmers are seriously to blame for much of this trouble, because they persist in throwing the dead carcases into the woods or streams. Two Bureau officers have left here for Centreville, Queen Ann County, to inform themselves about two serious outbreaks there. This county has been visited by this disease at frequent intervals, although free from bovine pleuro."

THE SMALL-POX MICROBE.—Dr. Sicard, of Béziers, in a memoir handed in to the French Académie de Médecine for competition for the Alvarenga prize, announces that he has at last discovered the long-sought-for microbe of Small-pox. He reports it to be a bacterion belonging to the class of cocci; round, with a transparent centre, umbilicated in the middle, while its edges are raised, and offering a diameter of five-and-a-half-thousandths of a milimetre. This bacterion can be readily cultivated on gelatine that has been sterilised by bichloride of mercury. It can be found at all stages of Small-pox, not only in the pustules of the skin, but in the mucus of the bronchial tubes and in the blood as well. It is likewise found suspended in the air of rooms containing Small-pox patients, and if water be allowed to stand in such rooms in open vessels it soon contains the Small-pox bacterion. However, when animals are inoculated with cultures of this bacterion, although they manifest uneasiness, the symptoms are entirely transitory, not at all serious, and, above all, show no relation to variola, either in its form or evolution.

CONTAGIOUS PLEURO-PNEUMONIA.—Professor M'Call, at the annual discussional dinner of the Renfrewshire Agricultural Association, held on Nov. 14th, at Paisley, read a long paper, in the course of which he observed that if inoculation were to free the country from the ravages of Pleuro-pneumonia, then it must be no half measure, but a system whereby every calf born or imported into the country must be subjected to inoculation with as much certainty as vaccination was applied to children, although he confessed the system must be brought about with enormous expense. He suggested that

the Minister of Agriculture should be memorialised to make the extinction of the disease and the granting of compensation the subject of Imperial legislation. Professor Williams strongly supported the arguments of the lecturer, and Professor Walley expressed the belief that if the slaughter order were properly carried out, the country would be rid of the disease in two years.

Good Oats.—How to tell good oats is a most useful matter, observes the *Mark Lane Express*, as it concerns every owner of horses in the country. We have just come across a descriptive article on the subject in a scientific paper, to which it is contributed by a good botanical authority. According to this, good oats are clean, hard, dry, sweet, heavy, plump, full of flour, rather like shot, and have a clean and almost metallic lustre. Each oat in a well-grown sample should be nearly of the same size, and there should be but few small or imperfect grains. Then, again, the hard pressure on an oat should leave little or no mark, and the kernel, when pressed between the teeth, should leave little or no mark. The skin should be thin, while it will be found that the size of the kernel will be less in proportion than the skin is thick. The colour of the oat is not very material, but white oats are generally thinner in the skin than black. Again, black oats will grow on inferior soils. Short, plump oats are preferable to large, long grains. In all bearded oats there is an excess of husk, but oats are not necessarily bad because they are thick-skinned and bearded. They must, however, contain a less amount of flour per bushel than thin-skinned oats without beards, and so are worth less money. It is a question of degree in value received, rather than of badness of quality.

Tuberculosis.—M. Daremberg has made a series of experiments on the lower animals, which inspire him with the hope of eventually obtaining a prophylactic vaccine for Tuberculosis. He observed, during his researches, that oil or fatty substances given to the animals under experiment enables them to resist the Tubercular infection when the virus is inoculated under the skin ; glycogen had the opposite effect. When the virus is passed directly into the blood death is inevitable. Cod-liver oil is only useful when the entire organism is not infected by the tubercular virus ; it is a protective agent, not a curative. In all forms of Phthisis strengthening food and tonics help the economy to withstand the influence of the poisons formed in the stomach and intestines by abnormal ferments; they also facilitate the elimination by the kidneys, skin, etc., of the poisons resulting from defective nutrition found in the cells of different organs. The evolution of Tuberculosis can in some animals be rendered slower by gradually accustoming them to the influence of tubercular virus, and inoculating under the skin a small quantity of sterile Tuberculosis cultivation before inoculating the deadly one ; spinal medulla removed from an animal dead of Phthisis reduced to a pulp, and used for inoculation, has also this effect. M. Daremberg concludes from these researches that tubercular virus can be treated like mineral or organic poison ; it can be increased or decreased ; also that the animal economy can be protected more or less against the action of tubercular virus. With these data acquired he foresees the day when he will transform tubercular virus into tubercular vaccine. M. Nocard, a few months ago, read before the Biological Society a paper on "A New Form of Zooglœic Tuberculosis in a Cow." Some of its sputa was injected into a guinea-pig, and produced Zooglœic Tuberculosis. The cow was killed, but no special lesion was observed, only chronic Bronchitis. The bronchial tubes were dilated, and contained muco-pus. M. Nocard adopts MM. Grancher and Ledoux-Lebard's opinion, who consider the Pseudo-Tuberculosis observed in guinea-pigs and rabbits by MM. Charrin and Roger, also by M. Dor and M. Nocard, to be

identical with the Zooglœic Tuberculosis discovered by MM. Malassez and Vignal.

Army Horses in the United States.—There are nearly 10,000 horses in use by the United States army. Of this number about 10 per cent. are sold annually because of their unfitness for further cavalry or artillery duty, and about 5 per cent. are lost by death. So, in order to maintain the standard, it is necessary to purchase about 1,500 animals every year. When the stock of a garrison needs replenishing the Quartermaster-General's department is notified. An advertisement inviting bids is inserted in the prominent papers, and a contract entered into with the lowest bidder to deliver the horses at the desired point, if, after a suitable inspection by the Secretary of War, they meet the requirements of the standard fixed by the army regulations. The regulations require that the horse shall be a gelding of uniform and hardy colour, and from 15 to 17 hands high; from four to eight years old, and weighing between 900 and 1,200 pounds for a cavalry horse, and between 1,050 and 1,300 for artillery horses. There are other requirements necessary, such as the general build of the animals and their health. Whenever it becomes necessary to purchase the half-bred horses of California or Southern Texas the standard of the height is reduced to 14½ hands. Long-legged, loose-jointed, long-bodied, and narrow-chested horses, as well as those which are restive or vicious, are rejected. Most of the horses used in the army are purchased in St. Louis and Louisville, although the general rule of late has been to obtain the animals in the neighbourhood in which they are desired for use, the idea being to obtain thoroughly acclimated animals. The average cost of a horse is a trifle over 134 dols. As soon as the purchase is completed the horse is branded with the letters "U.S." on the left fore shoulder and a complete descriptive list is made of him, which always accompanies him wherever he is transferred. The horses are distributed by the regimental commander, and the riders or drivers are not allowed to exchange them or permit anyone else to use them. With every troop of cavalry a record of the animals is kept, containing the description of every one received and transferred, showing the kind, name, age, size, colour, marks, brands, or other peculiarities, how and when acquired and disposed of, the name of its rider and driver, and the use to which it is applied. The forage ration for a horse is fourteen pounds of hay and twelve pounds of oats, corn, or barley, and in special cases of hard service or exposure the grain ration is usually increased three pounds. In localities where good grazing is practicable for a considerable portion of the day, or during seasons when little labour is required of the animals, the ration is usually reduced. The animals usually last about six years, and at the end of that time are sold at auction, or before if they are disabled so as to be unfit for service. When sold the officer puts another brand on the horse, making it impossible for the horse to be sold to the Government at some other point. Condemned animals do not bring much. They are worthless for carriage purposes and are too much worn out to be fit for the arduous work of street-car hauling. They are usually sold to contractors, who employ them in hauling small loads. But the army horse does not last long after he drops out of the service. Usually he does not amount to much when the Government has no further use for his services, and his career thereafter is as short as it is uneventful.—*Washington Post.*

Lambs reared by Goats.—A novel and successful experiment in lamb-rearing has been carried through this season by Mr. David Picken, Milton Farm, Kirkcudbright. Early in the lambing season several ewes died, leaving families, and Mr. Picken having three nanny goats on the farm, set two lambs to one of these and one lamb each to the other two. The foster-mothers

did not for a time take very kindly to the lambs, but in a day or two they became inseparable, and the lambs throve beyond expectation, being the sturdiest for their age on the farm. In one instance the lamb has a decided talent for climbing and leaping, and no wall or dyke on the farm presents any barrier to its progress.

Correspondence.

BLIND HORSES.

SIR,—Having the supervision of a large number of street-railroad horses, numbering about 9,000, about two per cent. of which are blind in both eyes, and notwithstanding their good condition I have observed almost in every instance that blind horses shed their coats only in the fall of the year, retaining a very short summer coat throughout the winter, and in the spring growing a very heavy winter coat, and retaining it throughout the summer. I have consulted several authors and some of my professional brethren on the subject, but failed to obtain any information as to the cause. Can any member of the profession throw any light on the matter?

Boston, U.S.A. ALEXANDER MARSHALL, M.R.C.V.S.

TO CORRESPONDENTS.

ERRATUM.—In the Editorial for last month, page 333, line 18, for "directly" read "directed."

THE report of Proceedings of Western Counties Veterinary Association will appear in next month's Journal.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from S. M. Taylor, Madras; R. Ward, Baltimore, U.S.A.; A. W. Hill, London; R. W. Burke, A.V.D., Athlone; J. McKenny, Dublin; F. C. Mahon, Southrepps; J. Malcolm, Birmingham; W. Penhale, Barnstaple; F. E. Place, London; D. Hutcheon, Cape of Good Hope; W. F. Greenhalgh, Leeds; A. W. Hill, London; A. Marshall, Boston, U.S.A.

BOOKS AND PAMPHLETS: *H. Weir*, Our Cats and all about them; Séance Publique Annuelle de la Société Nationale d'Agriculture de France; *J. H. Steel and T. J. Symonds*, Materia Medica Judica; Encyklopädie der Gesammten Thierheilkunde und Thierzucht; Procès Verbal de la Academie Royale de Médecine de Belgique; *F. Smith*, Chemistry of the Urine of the Horse; Hydrophobia of 1889, its Cause and Cure; *H. V. Stockfleth and C. Steffen*, Handbuch der Thierärztlichen Chirurgie.

JOURNALS, ETC.: *Wochenschrift für Thierheilkunde und Viehzucht; Thierarzt; Journal of the Agricultural Society of Victoria; Journal of Comparative Medicine and Surgery; American Veterinary Review; Horses Illustrated; Colburn's United Service Magazine; Annales de Méd. Vétérinaire; Repertorium der Thierheilkunde; Live Stock Journal; Lancet; Revue Veterinaire; British Medical Journal; American Live Stock Journal; Quarterly Journal of Veterinary Science in India; Edinburgh Medical Journal; Recueil de Med. Vétérinaire; Journal de Med. Veterinaire et de Zootechnie; London Medical Record; Deutsche Zeitschrift fur Thiermedicin und Vergleichende Pathologie; Echo Vétérinaire; Clinica Veterinaria.*

NEWSPAPERS: *Melbourne Daily Telegraph; North Star; Edinburgh Evening News; New York Herald.*

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